MODULE 4

TELECOMMUNICATIONS

“The advantage of modern means of communication is that they enable you to worry about things in all of the world*”. - Laurence J. Peter, a Canadian educator.*

Learning points for Module 4:

Reading:

Text A. The Role of Technology in the Evolution of Communication

Text B. Is Television Dying?

Text C. Electromagnetic Waves

Vocabulary in the context: Word definitions/Collocations/The opposites/Word quiz

Grammar: Sequence of Tenses/Reported Speech

Speaking: The Future of TV and Telecommunication discussion

Skills: How to ask a “good” question

Learning aims:

- to practise reading and speaking about telecommunication technologies;
- to learn and practise active vocabulary related to the topic of the

module;

- to learn and practise sequence of tenses and reported speech;
- to learn and practise the skill of asking good questions.

Lead-in

Spell the jumbled words correctly. They are all means of communication listed in a chronological order.

veca inainptg	hirolphegy	aperp	tirpning	gteperalh	pothelene

idaro	siloteevin	xfa nahicem	tirnteen	boilem nohep

A little bit of history

Put these inventions in telecommunications[1] in a chronological order.

Telephone	1844
Digital telephony	1957
All digital services	1946
Television	1876
First man-made satellite	1895
Telegraphy	at present
The first radio signal was sent	1925
General purpose electronic computer	1990s

[1]*tele - from a Greek word meaning 'far', means 'distant', especially 'transmission over a distance', used in the formation of compound words.*

READING

Part 1

1. *Skim the article and decide which of the following sentences best answers the question what the article is about.*

1. The article is about communication technologies.

2. The article is about how communication technologies developed.

3. The article is about the evolution of communication technologies and their role in modern society.

Text 4A

THE ROLE OF TECHNOLOGY IN THE EVOLUTION OF COMMUNICATION

(1) It is obvious that technology and telecommunications have been moving back-to-back[1] and the latest technological breakthroughs have resulted in bringing global telecommunications to a brand-new level. **1**_____, as the human relations and communication evolved[2], they also added to the further development and newer discoveries which seem revolutionary even now, pushing it all forward from one level to another.

A minute of history

(2) There were a few main steps in history that were the turning points and led to the rise of communication technologies. Stone pictographs invented in ancient times gave rise to the first written communication. **2**_____, then paper, and wax, as well as a printing press in 15th century, made it possible to transfer the first documents, unlike stones which were immobile. This enabled to expand[3] literacy throughout the globe and increase the level of communication.

(3) The first true telecommunications system using electrical signals to carry messages started in the 1840s with machine telegraphy. **3**_____ the telegraph and the telephone, which enabled speech to be transported along wires. The introduction and application of electromagnetic waves played an important role in the history of communications. They were used to transmit radio or TV signals and **4** _____ **.** Improvements in materials and devices enabled the transmission of information via cables. The space race led to another means of communications via earth stations to artificial satellites.

(4) As further advances[4] in technology took place (e. g. the invention of the transistor and the development of microelectronic integrated circuit technology), new applications became feasible[5] and new systems were developed. For example, computers pushed the limits of telephone systems to send computer messages. The need for higher transfer speeds encouraged the development of digital transmission technology (the transition of coded data). One of the major later developments was the optical fibre cable which became the main medium of **5**_____.
Another rapidly growing field today is data communications employing high-speed digital techniques. The most important technology for the human communication in the age of personal computing has probably become the development of the global communication network – the World Wide Web.
(5) Modern society seems to have a bit of an obsession[6] with technology. **6**_____ than the mobile phone. Back in the early days of mobile phones, their only use was for calling other people whilst[7] on the move. Today, you can use a mobile phone to do literally[8] everything, from paying for your meal to tracking your sleeping habits. Modern smartphones have almost no limits and have become indispensable[9]. According to research, we spend almost 800 hours on our mobile phones in an average year. **7**_____, it is no surprise that the last ten years have been labelled as the 'decade of the smartphone'. The evolution of means of communication is a really thrilling journey.

Vocabulary notes for text 4A

[1]back-to back	непрерывно следующий за чем либо
[2]evolved	эволюционировали, развивались
[3]to expand	расширяться
[4]advances	достижения
[5]feasible	возможный, выполнимый, реальный
[6]obsession	одержимость
[7]whilst	пока
[8]literally	буквально, в прямом смысле

[9]indispensable незаменимый

2. ***Read text 4A again. Complete the gaps 1-7 with the sentences A-H below. (There is one extra sentence which you do not need to use).***

A Further on, the invention of papyrus,

B provided the basis for radio and TV broadcasting.

C But no single device has had as much of an impact on the world

D And with these figures rising all the time

E When sending information

F Apart from the technological shifts

G The major breakthroughs were

H data transmission for telecommunication and information technologies.

3. ***Guess the words from text 4A using the definitions. Then practice giving the definitions of these words.***

1. Technology of sending signals, images, and messages over long distances by radio, telephone, television, satellite.

2. A system for talking to somebody over long distances, using wires or radio.

3. An electronic machine that can store, organise and find information, do calculations and control other machines.

4. A method of sending messages over long distances, using wires that carry electrical signals.

5. A piece of equipment used for listening to programmes that are broadcast to public.

6. Telecommunications device which circles the earth to receive, amplify and retransmit signals around the world.

7. An electronic device that receives television signals and displays them on a screen.

8. A widely accessible (доступный) system of networks that connects computers around the world using a common software protocol for transmitting and receiving data.

9. A cable consisting of one or more thin flexible fibres (волокно) with a glass

core (сердцевина) through which light signals can be sent with very little loss of strength.

10. Electric signals expressed as a series of the numbers 1 and 0, so they have only a number of possible states, as opposed to analogue signals which are totally variable.

4. ***Read the text in detail and answer the following questions.***

1. What examples of the first means of communication can you give? 2. What were the first telecommunications systems that used electrical signals? 3. What invention revolutionised personal communication? 4. What discovery provided the basis for radio and TV broadcasting? 5. What other methods of transporting information over long distances appeared over time? 6. What was one of the later developments which became the main medium of data transmission? 7. What technology made it possible for people to communicate on a global scale? 8. What device has probably impacted our lives the most over the last two decades?

5. ***Make up sentences with the following word combinations.***

Telecommunications systems; electrical signals; electromagnetic waves; radio and TV broadcasting; artificial satellites; data transmission; optical fibre cable; modern smartphones.

6. ***Explain how you understand the phrases from the text. Think of your own examples to illustrate the points.***

1. It is obvious that technology and telecommunications have been moving back-to-back**.**
2. The space race led to another means of communications via artificial satellites.
3. Computers pushed the limits of telephone systems to send computer messages.
4. Modern society has always seemed to have a bit of an obsession with technology.

5. Modern smartphones have almost no limits and have become indispensable.

7. ***Work in pairs. Write a list of key points of text 4A. Summarise the information in text 4A using your list of key points.***

READING

Part 2

8. ***In groups answer the questions.***

1. Do you have a TV set at home? 2. Do you ever watch TV? 3. How much time do you watch TV every week? 4. Do you think television will remain one of the most important means of communication in the next 30 years?

9. ***In groups look at the list of the words from the article that you are going to read. If someone in your group knows some words from the list, let them explain their meaning to your group. Look up the words that nobody in your group knows and exchange your information. Give an example of how each word can be used.***

Example: *Nevertheless is an adverb meaning however or even so. → I'm tired. Nevertheless, I'm ready to help.*

Nevertheless / threat / essential / heartbreaking / amusing / consistently / groundbreaking / meanwhile / emergence / radically / attitude / settle in / substantially / sophisticated / to convince /merely / to float / battlefield / over the long haul.

10. ***Read the text and decide what the author's answer to the question asked in its title is.***

Text 4B

IS TELEVISION DYING?

(1) It is difficult to imagine our life without television. Nevertheless, young people say that television is dying*. The Internet, the main 'threat' to television, is clearly winning. Though, even if we do not watch TV, it is still an essential part of our culture. It has been heartbreaking, amusing, informative, and just part of life of

several generations. The technology behind it has been consistently groundbreaking.

(2) Meanwhile, this invention is just over 100 years old. Television, the history of the emergence and development of which fits into such a small period by the standards of history, has radically changed our communication, attitude to information and our culture. Can it surprise us again and again? Yes, it can. It has greatly changed - from first CRT[1] TVs to modern OLED[2] Ultra HD[3] sets, and we are sure we will not need or want another television for the next decade or more. But, as history has proven time and again*, the Next Great Thing is already well into its development cycle, even if we are just starting to get settled in* with current technological standards.

(3) What of the distant future? If only someone could come up with something that would virtually make our jaws drop*! Perhaps, they already have. Are you ready for 3D holographic television? This kind of 3D is substantially more sophisticated than producing image with some special glasses, it will convince you objects exist outside the surface of the viewing screen. With holographic TV, images do not merely project outward from the TV set, as much as they appear to float in mid-air. And yes, that means you will be able to walk around a specific object and look at it from behind. Or even put yourself in the middle of the action – whether that action is a sporting event, a battlefield, or something else altogether. 3D holographic televisions will be really expensive, though, and nobody knows if the public will enjoy the 3D sensation over the long haul. But remember, they said that about colour television back in your grandparents' day too. Or maybe young people are right: TV is dying?

[1]CRT (Cathode Ray Tube) - a tube-shaped part in a television screen, inside which a continuous flow of electrons is produced to create an image or a text.

[2]OLED stands for organic light emitting diode. It is the evolution of the traditional LED TVs which use light emitting diodes to light up a display. OLED TVs have the ability to turn each pixel on and off resulting in really deep blacks.

[3]Ultra High Definition (and 4K) offer four times the pixels of a standard 1080

(high definition) display. One of the primary benefits of 4K is that you can sit closer to the screen without noticing any pixellation.

STUDY NOTE. In the phrases from the text marked with * the words are used figuratively, which means they do not have the meaning of the word or phrase itself (literal) but a different meaning implied by it (idiomatic). Figurative language makes ideas and concepts easier to visualise or more expressive.

**some people say television is dying - is getting ready to stop existing*

**to get settled in with current technological standards – to adapt*

**make our jaws drop – surprise very much*

**time and again (an idiom)- repeatedly*

11. ***A fact or an opinion. Which of the statements can be considered 'a fact' (it can be proved to be true) or 'an opinion' (a view which is not necessarily based on fact)? Give your arguments.***

1. It is difficult to imagine our life without television.
2. The Internet is the main threat to television.
3. TV is an essential part of our culture.
4. Television is dying.
5. The technology behind television has been consistently groundbreaking.
6. Television has changed our communication.
7. Television has greatly changed.
8. Television can surprise us again and again.
9. 3D holographic TV is a new television technology.
10. 3D holographic TV will replace modern TV technologies.

12. ***Read the text again and summarise it in 6-8 sentences. Use the following words:***

The text is about…; The author tries to answer the question…; According to the author's opinion...; On the one hand/on the other hand…; In conclusion, the author … .

13. ***Discuss in groups the following questions after reading text 4B.***

1. Did you enjoy reading Text 4B? Why? Why not? 2. Was there any new information for you in this text? What information was it? 3. Which of the author's ideas do you agree or disagree with? Explain why.

14. ***Listening on the topic. Watch this interview with David Wood from European Broadcasting Union. What questions does he answer? What is his opinion about the television? What arguments does he give in favour of his views? While listening, note down some useful language to prepare for discussion "The Future of TV.***

https://www.youtube.com/watch?v=Zzz5uQJGpfg

15. ***The future of TV Discussion. Work in pairs.*** Students **A** strongly believe that TV is obsolete; Students **B** strongly believe that TV has a promising future. Then change your partners and talk about your ideas again.

READING

Part 3

16. ***Read the text quickly and circle any words that you do not know. In groups, pool unknown words and use dictionaries to find their meaning.***

Text 4C

ELECTROMAGNETIC WAVES

(1) How do we understand the information our eyes take in from the outside world? Science tells us that light is the reason we are able to see objects. And the light is a form of electromagnetic radiation made by electromagnetic waves. Electromagnetic radiation is a stream of photons that travels in a wave-like pattern, carrying energy, and moving at the speed of light. The electromagnetic spectrum is the range of all types of electromagnetic radiation. Our eyes are capable of seeing only a small portion of the electromagnetic spectrum. There are plenty of waves in the physical world that we simply do not see.

(2) If our eyes were capable of seeing every type of wave on the electromagnetic spectrum, a commonplace sight like your university cafeteria would look

completely chaotic! You would see microwaves, radio waves and different types of electromagnetic energy bouncing off practically every surface. And that is just within the known spectrum. Scientists imagine that the spectrum goes on forever, with infinite types of waves.

(3) The waves emitted by our physical world make it possible for us to communicate over vast distances, see objects in the dark that are deep beneath the surface of the earth and sea, and even look deep into outer space. By studying electromagnetic waves and creating tools that help us gain access to a wider portion of the electromagnetic spectrum, humankind has given itself unique powers for collecting information about the world. We can think of the waves as a kind of ongoing message being sent out by the universe.

(4) But even without special tools and machines our eyes sensitivity to light makes it possible for us to see beautiful things: a bouncing basketball; a tall, vivid rainbow after a storm; the faces of our friends and families. If it were not for the way our eyes and brain are able to create comprehensible images from waves of visible light, it would be very difficult for us to understand the messages emitted by our physical universe.

17. ***Read the text again and answer the questions.***

1. What is the reason we are able to see objects?
2. What is the definition of light?
3. What is the definition of electromagnetic radiation?
4. What is the definition of electromagnetic spectrum?
5. What portion of the electromagnetic spectrum can we see?
6. What would the world look like if our eyes were able to see every type of wave?
7. What do waves emitted by our physical world make possible?
8. What has studying electromagnetic waves allowed us to achieve?

18. ***Choose the right option.***

1. What is the text mainly about?

A. why waves have different wavelengths;

B. electromagnetic waves and how humans utilise them;

C. different tools humans have invented to harness information.

2. We can think of electromagnetic waves as a kind of ongoing message being sent out by the universe. Humans are able to naturally access only a portion of this message. What information from the passage best supports this statement?

A. If only our eyes were capable of seeing every type of wave on the electromagnetic spectrum!

B. We would see microwaves, radio waves and different types of electromagnetic energy;

C. The human eye is only sensitive to a portion of the electromagnetic spectrum.

3. Read the following sentence: "If our eyes were capable of seeing every type of wave on the electromagnetic spectrum, a commonplace sight like your university cafeteria would look completely chaotic!" Why might the author have started the passage with this sentence?

A. because the main idea of the passage is about a cafeteria;

B. to give the reader an object to visualise;

C. because the author wants to use the example of cafeteria to explain what our eyes are capable of seeing.

4. Choose the answer that best completes the sentence below.

Humans have invented many tools that allow us to access a wider portion of the electromagnetic spectrum. _____, humankind has given itself unique powers for collecting information about the world.

A. As a result; **B**. However; **C**. Since.

19. ***Discuss why humans might want to gain access to a wider portion of the electromagnetic spectrum? Use information from the passage to support your answer.***

VOCABULARY

Module 4 Word List

Essential Vocabulary

1. advance (v, n)
2. application (n)
3. artificial (adj) satellite (n)
4. average (adj)
5. breakthrough (n)
6. bring (v) something to a new level
7. broadcast (v, n)
8. carry (v) messages
9. data transmission (n)
10. digital (adj)
11. electromagnetic (adj) wave (n)
12. employ (v)
13. enable (v) something
14. encourage (v) something
15. evolve (v)
16. expand (v)
17. improvement (n)
18. in ancient (adj) times
19. indispensable (adj)
20. integrated circuit (n)
21. lead (v) to
22. means (n) of communication (n)
23. medium/media (n)
24. network (n)
25. obvious (adj)
26. play (v) a role
27. push (v) something forward
28. rapidly (adv)
29. relation(s) (n)
30. result (v) in
31. technique (n)
32. telecommunication (n)
33. transmit / transfer/ transport (v)
34. turning point (n)
35. wire/cable (n)

Additional Vocabulary

1. amusing (adj)
2. attitude (n) to
3. comprehensible (adj)
4. consistently (adv)
5. convince (v)
6. emerge (v) /emergence (n)
7. emit (v)
8. essential (adj)
9. exist (v)
10. groundbreaking (adj)
11. imagine (v)
12. meanwhile (adv)
13. nevertheless (adv)
14. prove (v)
15. sophisticated (adj)
16. specific (adj)
17. substantially (adv)

20. ***Match the words with numbers (1-9) in each column (A, B, C) with the words with letters (a-i) to make up word collocations. Explain the meaning of these expressions and try to recall how they were used in text 4A.***

Example: *1-f: the latest breakthroughs → The* ***latest breakthroughs*** *have resulted in bringing global telecommunications to a brand-new level.*

A.	**B.**	**C.**
1. the latest	1. radio and TV	1. digital transmission
2. to bring to	2. to deal with	2. the optical fibre
3. a turning	3. the medium of	3. in ancient
4. give	4. electromagnetic	4. a rapidly growing
5. to expand	5. to play	5. a means of
6. to enable speech	6. (an) obvious	6. (an) integrated
7. to transmit	7. to take	7. to push something
8. artificial	8. (an) effective	8. to carry
9. further advances	9. to encourage	9. to lead to
a. rise to something	a. a problem	a. times
b. satellites	b. waves	b. circuit
c. signals /information	c. technique	c. messages
d. point	d. the development	d. forward
e. a brand new level	e. reason	e. technology
f. breakthroughs	f. data transmission	f. cable
g. literacy	g. broadcasting	g. communication
h. in technology	h. a role	h. a disaster
i. to be transported	i. place	i. field

21. ***Vocabulary in context. Read the sentences below and circle the key words and expressions from the previous exercise. Translate the sentences into Russian****.*

A.

1. Heavy rains have given rise to flooding over a large area. 2. The information is transmitted electronically to the central computer. 3. The World Cup was transmitted around the world by satellite. 4. The latest medical breakthroughs brought the treatment of cancer to a new level. 5. Ban on smoking in public places became a turning point in the campaign against smoking. 6. These companies need to expand into new markets. 7. Computerisation will enable us to cut our costs. 8. They discussed what equipment they needed for the transmission of television signals. 9. Recent advances in telecommunications mean that people can always stay connected.

B.

1. The arrival of satellite television changed the face of broadcasting. 2.The concert takes place next Thursday. 3. A digital technique for high-speed visualisation has been developed by our laboratory. 4. Scientists predict a major breakthrough in dealing with the pandemic in the near future. 5. Children should be encouraged to learn foreign languages at school. 6.Yoga is a very effective technique for dealing with stress. 7. Radio became the first electronic broadcast medium which was used for mass communication. 8. Some people think that electromagnetic waves from mobile phones have a bad effect on their health. 9. According to the research, vaccination will play an important role in dealing with the coronavirus.

C.

1. After the pandemic started there has been a rapidly growing demand for face masks. 2. Some people think that music is an effective means of communication. 3. A strand of optical fibre as thin as a human hair can transmit the equivalent of millions of words in a single second. 4. They were receiving a live transmission from the scene of the accident. 5. The ecologists will discuss the environmental problems that might lead to a disaster if people don’t deal with them. 6. In ancient times astronomers named stars after gods. 7. The improvements in technology resulted in better performance. 8. Many people believe that space technologies will push human civilization forward. 9. Wires that carry messages mock space and

outrun time.

22. ***Complete each sentence with the correct form of the word in capitals.***

Example: *The current state of U.S.- China _____ was discussed at the conference. RELATE → The current state of U.S.-China relations was discussed at the conference.*

1. E-mail is the most often used _____. APPLY 2. High-speed _____ of data has speeded up access to these sites. TRANSMIT 3. A key part of our plan is _____ efficiency. IMPROVE 4. Nowadays people can get in touch easily because of_____ in communications. ADVANCED 5. Computer-_____ industrial production has lots of benefits. INTEGRATE 6. Your password should contain both letters and _____ . DIGITAL 7. Sophisticated statistical analysis was _____ to obtain these results. EMPLOY 8. Mass media informed the public about the _____ of a new strain (штамм) of the coronavirus. EMERGE 9. Modern science believes that our universe came into _____ about 15 billion years ago. EXIST 10. The virus attacks _____ cells in the brain. SPECIFY

23. ***Match the words in column A with their opposites in column B.***

Example: *'to evolve' is the opposite of 'to decrease, worsen'.*

A		**B**	
1.	ancient	a.	boring, annoying
2.	to expand	b.	slowly, gradually
3.	to improve	c.	to decrease, reduce
4.	advancement	d.	simple, low-tech
5.	rapidly	e.	useless
6.	indispensable	f.	to worsen
7.	essential	g.	regression
8.	amusing	h.	modern, contemporary
9.	sophisticated	i.	recession
10.	breakthrough	j.	unclear

11. obvious k. unimportant

24. ***Rewrite each sentence below replacing the underlined words by one of the words from the previous exercise so that it has an opposite meaning to the first sentence. Translate the sentences into Russian.***

Example: *My relationship with my sister has worsened over time .→ My relationship with my sister has evolved over time.*

1. We were warned against hidden dangers of hot climate. 2. Sometimes a regression in the development of cognitive skills occurs. 3. The film is set in modern times. 4. The company is planning to reduce the average output of cars next year. 5. The situation in economy is getting worse. 6. The recent recession in medical research will have a significant impact on the health care system. 7. The reason for his bad behavior is not clear. 8. The market for our new products is developing gradually. 9. The instructor said that the mobile phone would be useless in the woods. 10. Good communication skills are not important for an IT specialist. 11. This new computer game is really boring. 12. Most of the products of this start-up company are very simple.

25. ***Word Quiz. Guess the word.***

Choose from: to evolve, threat, relations, to prove, network, indispensable, to convince, groundbreaking, digital, telecommunication, to imagine, essential, to emerge, application

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1. Communication over a distance by cable, telegraph, telephone or broadcasting.
2. To change or develop into a better, more advanced state.
3. A system of interconnected people or things.
4. Good or important, describing something you can’t do without.
5. To picture something in your head.
6. A danger that has the potential to cause serious harm.
7. Very important, necessary

8. To talk someone into something.

9. To show that something is true

10. An adjective to describe something new, unusual, or first made.

11. To come out, appear or become known.

12. Social connections or communications among people or groups.

13. The act of putting something into operation.

14. A type of signal that uses a binary code (numbers) to transmit information.

26. ***Fill in the gaps in the sentences with the words from the previous task. Change the word form if necessary.***

1. Computer is _____to modern life. 2. Coronavirus is a serious _____ to everyone. 3. Some nice results _____ from the study. 4. Distance is no problem with modern _____ systems. 5. The quality of the _____ TV pictures is excellent. 6. All our computers in this office are part of a _____. 7. Electrical power has lots of _____. 8. How can you _____ that the world is round? 9. As long as the technology continues _____ we all should be lifelong learners. 10. We should _____our students to work harder on their dissertations. 11. We can't _____ life without mobile devices today. 12. It is _____ to turn off electrical appliances before leaving a house to prevent a fire. 13. The development of vaccinology was really _____ as it helped eliminate a lot of dangerous infectious diseases. 14. It is in your best interests to have good _____ with your boss.

27*. ***Discuss the questions in pairs.***

A. Does watching TV in HD (high definition) use more electricity than SD (standard definition)?

B. Does leaving appliances on standby use a lot of electricity?

Student A. ***Read the answer to question A and fill in the gaps with the proper form of the words given on the right. Then use the information in the text to help you answer your question.***

A.

No. It has nothing to do with the format of the broadcast. Energy 1_____ is more a factor of the display technology used to render the image. A cathode ray tube (old TVs used these) uses much more power than LCD display, 2_____ on which light-source technology is used; LED is more 3_____ than CCFL.

Plasma displays use 4_____ less than CRTs and more than LCD panels. OLED displays 5_____ use less power than LCDs. Digital 6_____ also uses less power than the old analogue technology. There's also slightly increased power consumption based on bit-rate, but it is miniscule compared to the amount of energy 7_____ to power the actual light-emitting part of the system.

CONSUME

DEPEND
EFFICIENCY
SLIGHT
TYPICAL
PROCESS

REQUIRE

Student B. ***Read the answer to question B and fill in the gaps with the proper form of the words given on the right. Then use the information in the text to help you answer your question.***

B.

Most modern home 1 _____ consume a negligible amount of power in standby mode; the days when they consumed almost as much as when they were 2_____ on are long gone. As such, all this stuff about turning off 3_____ on standby is pretty much obsolete, as with TVs and similar 4_____ made in the last five or so years, the amount of electricity saved by 5_____ them off is literally just a few pence per year. If in doubt, it would be worth checking your electric meter reading. However, most recent appliances, when they are left on standby, hardly use any

ELECTRON

TURN
APPLY

EQUIP
TURN

CALL

power. Standby power, is also 6 _____ vampire. It 7_____to the way electric power is consumed by electronic and electrical appliances while they are 8_____ off or in standby mode.	REFER SWITCH

28. ***Name three things that:***

- are means of communication;
- can be transmitted via cables;
- were essential for the invention of TV;
- are associated with TV of the future;
- are made possible by the electromagnetic waves.

29. ***Work in groups. Prepare 10-15 examples with the words from vocabulary section. Write them on separate cards using gaps instead of the key words. Exchange your cards with other groups and do the gap filling exercise. Check your answers.***

30. ***Summarise in English using some words from Module 3 word list.***

Поворотным моментом в истории развития средств коммуникации было открытие электричества, благодаря чему возникла возможность быстро доставлять сообщения на значительные расстояния. Это привело к появлению сначала проводной (телефонной и телеграфной), а затем и беспроводной связи, что создало базу для всех средств массовой информации – радиовещания, телевидения, интернета, мобильной связи. Дата рождения первого электрического телефона - 14 февраля 1876 г. В этот день в американское патентное ведомство (patent office) поступила заявка на аппарат для передачи звуков на расстоянии посредством электрического

тока. Она принадлежала американскому преподавателю школы глухонемых (deaf people) А. Г. Беллу. А. Белл решил создать аппарат, превращающий звуки в световые сигналы. Во время проведения опыта свободный конец одной из пластинок (free end of one of the plates) на передающей стороне линии приварился (was welded) к контакту. Помощник Белла механик Томас Ватсон, безуспешно пытался устранить неисправность. Находящийся в другой комнате и манипулировавший приемными пластинками Белл уловил звук, дошедший по проводу. Это и был день рождения телефона. В нашу эпоху информационная сфера деятельности человека переходит на новый уровень. Потребности в телекоммуникациях привели к активным исследованиям, (both … and) как в области условий распространения электромагнитных волн, так и методов обработки (processing) сигналов. Результатом исследований явилось появление отдельных родов связи, таких как, проводная, радио, спутниковая.

SPEAKING AND DISCUSSION

31. ***Discussion. The Future of Telecommunication Technologies.***

In pairs write five questions about the future of telecommunication technologies. Before writing your questions, read the information in Appendix 1 about how to ask good questions. Each student must write the questions on their own paper. When you have finished, interview other students. Write down their answers. Then return to your first partner and talk about what you have found out.

	Student 1	Student 2	Student 3
Q. 1			
Q. 2			
Q. 3			
Q. 4			
Q. 5			

Example: *Question: Is cabled communication disappearing? Answer: Today there are two main communication media solutions: wired and wireless technology. Each of them has its advantages and disadvantages and the choice of one or the other depends on its particular application. So, I don't think that wired technology is disappearing. It's just more likely that the wireless one is getting more common nowadays.*

32. *The Importance of Communication Skills.*

The Internet causes social isolation and, as a result, people suffer from loneliness. Moreover, the addiction to virtual communication makes people forget about real life. They do not want to socialise with people face to face, as they are not used to real-life communication, which is essential if you want to succeed in life and to be happy.

To what extent do you agree with this opinion? Discuss your opinions in mini groups, summarise your points and report them to other groups.

GRAMMAR

SEQUENCE OF TENSES

Lead- in

Compare the sentences from text 4B in two columns and answer the question below.

The text says that:	**The speaker said that:**
It **is** difficult to imagine our life without television.	It **was** difficult to imagine our life without television.
Television **has** changed our culture.	Television **had** changed our culture.
Other means of telecommunication **are** developing rapidly.	Other means of telecommunication **were** developing rapidly.
Nobody really **knows** if the public **will** enjoy the 3D sensation soon.	Nobody really **knew** if the public **would** enjoy the 3D sensation soon.

Which tenses do we use when we change from giving a description of the events

to reporting these events using "said that"-clause? Complete the rule with the words:

past past "sequence-of-tenses" main

If the verb in the _____ sentence is in the _____tense, then the verbs in the subordinate (придаточный) clause must also be used in one of the _____ tense forms. This is called the _____ rule.

REPORTED SPEECH

33. ***Complete the table using the examples given below.***

Direct Statement	**Reported Statement** *(after a past form of a reporting verb)*
The Present Simple Tense The Present Continuous Tense The Present Perfect Tense The Past Simple Tense The Past Perfect Tense Will/can/may/is going to	The Past Simple Tense

Direct Statement	**Reporting**
1. I work so hard that I am always tired.	1. He said that he worked so hard that he was always tired.
2. Ann isn't enjoying her work.	2. The professor was surprised that Ann wasn't enjoying her work.
3. The conference has been badly organised.	3.The article said that the conference had been badly organised
4. He made many mistakes in his last test.	4. He saw that he had made many mistakes in his previous test.
5. She had finished most of the work by 9 pm.	5. She insisted that she had finished most of the work by 9 pm.

6. New software will make computers more secure.	6. He thought that new software would make computers more secure.
7. He is not going to eat it.	7. He said that he was not going to eat that.
8. He will win.	8. I was sure he would win.
9. I may be a little late.	9. I warned you I might be late.

STUDY NOTE. The choice of the tense form depends on whether the action of the subordinate clause is:

a. simultaneous (одновременный) with the action in the main clause;

b. precedes it; or

c. follows it.

We use the Past Simple and Continuous for **a**, the Past Perfect Simple or Continuous for **b**, and Past Modal Verb forms for **c**.

I opened the door and saw that it was raining outside. I opened the door and saw that everything was wet: it had been raining all night. They said on TV that rain would start in an hour.

Back-shift **does not** occur if a reporting verb is in the Present Tense.

"I haven't seen this film." She says that she hasn't seen this film.

34. ***Choose the right form of the verb in brackets.***

1. I wonder if anybody (has come/had come) to her party. 2. My father promised that he (will arrive/would arrive) in a few days. 3. My mother was sure that I already (have left/had left). 4. He did not know if there (is/was) anybody in the room. 5. We hope the rain (will stop/would stop) soon. 6. He could not answer my questions about the capital of the UK because he never (has been/had been) to London. 7. I wanted to know who (is playing/was playing) the guitar in the next room. 8. It was expected that he (will have finished/would have finished) his experiment by the end of the day. 9. I looked out of the window and saw that it (had been raining/has been raining). 10. Mike said he (has not/had not seen) his

university friends for ages.

STUDY NOTE. Some exceptions:

1. We don't change tenses in informal speech when we want to make clear that the situation has not changed: *"I'm tired" → He told me that he is tired.*

2. If a general truth is expressed: *Galileo proved that the Earth revolves around the Sun.*

3. Sometimes, when a sequence of events is clear from the context, the Past Simple and Continuous remain unchanged: *The victim said that he was hit over the head.*

35. ***Rewrite the sentences in reported speech paying attention to the verb forms.***

1. "I **need** a new car," Greg said. Greg said (that) he _____ a new car. 2."He'**s working**," she said. She said (that) he _____. 3**.** "I'**ve** already **written** the abstract," he said. He said (that) he _____already _____ the abstract. 4. "I **got up** late," Tonia said. Tonia said (that) she _____ late. 5. "I **was working** at 5 o'clock," Tim said. Tim said (that) he _____ at 5 o'clock. 6. "I'**ll call** you in the evening," Rita said. Rita said (that) she _____ me in the evening. 7. "I **have already done** the work" Ann said when I came. Ann said (that) she _____ the work when I came. 8. "We **had been driving** for two hours when we saw the lights of the village," Tom said. Tom said (that) they _____ for two hours when they saw the lights of the village.

36. ***Put the verbs in brackets into the correct tense form. In some sentences answers may vary.***

A. 1. When he looked out of the window, he saw it (rain). 2. We are sure Mike (marry) her soon. 3. My mum never remembers where she (put) her glasses. 4. We all thought the restaurant (be) too expensive so we had dinner at home. 5. She was upset very much because she (not get) the job. 6. Nobody understood why they (break) up. 7. They were not sure if they (be able) to find their way back home when it got dark. 8. Ann didn't show up so everybody asked me if I (invite) her to the party. 9. They say that he always (be) very annoying. 10. When we met she

said she (wait) for me for hours.

B. 11. I was sure that I (not give) my telephone number to anybody. 12. I am afraid I (not can) answer your question. 13. When they got the news that Kate wasn't well they wanted to know what (happen) to her. 14. My husband said that he (can) repair the car himself. 15. She is very upset: she (break) her favourite mug. 16. They reported that thousands of people (get) infected after the outbreak of coronavirus in China. 17. We thought she still (to be) in hospital. 18. We knew that Tom (arrive) but nobody knew where he (stay). 19. My friends promised they (come) to see me soon. 20. We had no doubt they (be) tired after the match.

Note the difference between *say* and *tell*:

With **say** we don't normally use the object or, if we do, we put **to** before the object. With **tell** we need the object indicating the person to whom the words were spoken: "*She is making progress," he said **to** me. → He **said** she was making progress. He* **told me** *she was making progress.*

P.S. **Tell** can be used without a personal object in some expressions: *tell a lie, tell the truth, tell a story, tell the time, etc.*

37. *Correct the mistakes in the following examples if there are any.*

1. Mike said me that he would be late. 2. Mike told that he would be late. 3. Jane said him that she'd come to the party. 4. I said my friend I was going to write an essay. 5. He told to me that he loved living in Moscow. 6. They told that they would arrive at five. 7. She never tells the truth. 8. Have you said the doctor about it?

38. *Write full sentences using the beginnings given below. Explain the meaning of reporting verbs or translate them into Russian.*

Example: *"The experiment went well." The supervisor reported…→ The supervisor reported that the experiment had gone well.*

1. "He has known his best friend since childhood." We thought that _____ 2. "The academic year is about to end." She was glad _____ 3. "I have passed all

the exams!". Dan couldn't believe _____ . 4. "We eat cornflakes for breakfast." The children mentioned _____ 5. "Prices are rising very quickly at the moment". Mother complained _____ 6. "I graduated in 2018." The candidate confirmed _____ 7. "I am guilty." The suspect admitted _____ 8. "We`ll come back at 10 o'clock." We promised that _____ 9. "I'm the best student in my group." He claimed that _____ 10. "I will think about it." She said that _____ .

39. ***Fill in the gaps with introductory verbs from the list below in the Past Simple.***

agree / complain / wonder / promise / explain / declare / claim / announce

Example: "*I'll adjust the new equipment tomorrow", he said to his boss. → He promised his boss that he would adjust the equipment the following day.*

1. "The experiment isn't financed properly, consequently, it won't go ahead!". He _____that the experiment wasn't financed properly and it wouldn't go ahead. 2. "Where did I leave my coat?". He _____where he had left his coat. 3. "Yes, it was a good result for the test". He _____that it was a good result for the test. 4. "All the employees will get their salary". The director _____that all the employees would get their salary. 5. "We only managed to stop the fire using local resources". The firefighter _____ how they had managed to stop the fire. 6. "The conference will discuss the world`s crisis". The statement _____ that the conference would discuss the world's crisis. 7. "The company lost quite a lot of money last year". The accountant _____that the company had lost a lot of money the year before.

STUDY NOTE. Reported commands, promises, agreements, offers, advice, requests, etc., generally use the infinitive (with the verbs: promise, advise, agree, offer, ask, request, encourage, etc.) *"Play the piano". → She ordered/asked/advised us* ***to play*** *the piano.*

"Don't play the sax".→ She ordered/asked/advised us ***not to play*** *the sax.*

40. ***Change the sentences according to the example.***

Example: *Open the door, please! (She asked) → She asked politely to open the door.*

1. Don't go there alone! (He said to his son) 2. I'll help you with your assignment. (She offered) 3. Try not to be late. (He advised me) 4. Pretend you're ill. (I told him) 5. Wait a few minutes. (She asked me) 6. Ok, I'll give you the money. (He agreed) 7. Tell me the truth! (He demanded) 8. I'll pay you on Friday. (He promised) 9. I won't tell you her secret. (He refused) 10. Keep quiet or I'll punish you. (He threatened)

STUDY NOTE. When we **report questions**, the word order is generally the same as that of statements: *"What's the time?" → Someone asked me what the time was.*

To report yes/no questions, **if or whether** is used: *"Do you have the time?" → Someone asked me* ***if*** *I had the time.*

However, we must use **whether**, not **if,**

- when we are asking someone to make a choice
  The question is whether you are an optimist or a pessimist.
- when we include the phrase *or not*.
  Did she say whether she wanted tea or not?

41. ***Rewrite the sentences, beginning with 'I asked'.***

Example: *Can you help me? → I asked if he could help me.*

1. What`s Peter`s address? 2. Do they like me or not? 3. Will you pass your exams? 4. When did the train leave? 5. Is the meeting on Monday or Tuesday? 6. When is the new manager coming? 7. Is service included or not? 8. Will you help me? 9. When did the lecture start? 10.Am I doing the right thing? 11. Is the room very expensive? 12. Can we get there easily? 13. Have you looked it up on the Internet? 14. What are you going to do? 15. Why is everybody looking at me?

STUDY NOTE. Sometimes we introduce a direct question with a short phrase:

Do you know when the seminar starts? → Can you tell me if the Moscow Kremlin overlooks the Yauza River?

42. ***Work in pairs. In turns ask for the following information, using the phrases: Do you (happen to) know… Can/could you possibly tell me…***

1. the time 2. the nearest holiday 3. the inventor of telegraph 4. the year of foundation of BMSTU 5. use your own idea!☺

43. ***Look at the following examples. What other changes take place in reporting? Write a list of changes in the table below.***

Direct Speech	Reported Speech
1. One day you'll understand why we worry about you now.	1. My parents always told me that one day I would understand why they worried about me in those days.
2. Did you see her yesterday?	2. He asked if I had seen her the day before.
3. I hardly go out these days.	3. I said that I hardly went out those days.
4. I saw Jack at a party a few months ago.	4. She said that she had seen Jack at a party a few months before.
5. Tom had an accident last week.	5. He said that Tom had had an accident the previous week.
6. We'll finish our work next month.	6. They said that they would finish their work the following month.
7. I am not feeling well today.	7. She said she was not feeling well that day.
8.We can have lunch now, we have a good café here.	8. He said we could have lunch then, they had a good café there.
9.It happened last month.	9.They said that had happened the month before.
10.Can you come here tomorrow?	10.She asked if I could go there the next day.

Direct Speech	*Reported Speech*
▪ now ▪ today, tonight ▪ this week / month / year ▪ tomorrow ▪ the day after tomorrow ▪ next week / month / year ▪ yesterday ▪ the day before yesterday ▪ last night ▪ last week / month / year ▪ ago ▪ here ▪ this / these	▪ **then**_____ ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____ ▪ _____

44. ***Put the sentences below into indirect speech. Make all the necessary changes paying attention to the underlined words.***

1. He said: "I want to carry out this research myself". 2. He said: "They will do this assignment on time". 3. He said: "They met last year". 4. He said: "This week I am going to Paris to buy new equipment". 5. He said: "I have never been here before". 6. I said: "I have been busy these days". 7. He said: "Artificial earth satellites were invented in the last century". 8. I said:" Now I am waiting for the result of the experiment". 9. I said: "Yesterday I stayed in because of the bad weather".10. He said: "Today I'll compare these results and draw a diagram".11. She said: "I sent him a letter a few days ago". 12. He said: "I can't go there today but I will probably be able to go tomorrow".

45. ***Work in pairs. In turn report the information on your card to***

your partner beginning with Ann (Bill, Tom etc. said…)

Student **A's** card.

How important is TV in your life? Here's what people said:

Ann: Telly takes about 40% of my time every day. It`s important for me because after work and everything I can relax in front of it. **Bill:** Personally I don`t watch that much TV. If I do I watch the news. I think TV has created a hyper-reality and changes people`s mindset if they watch it. It has a negative effect on people. **Tom:** TV is a great medium for communication. It covers a broad range of interests and expressions.

Student **B's** card.

How important is TV in your life? Here's what people said:

Kate: I enjoy watching telly, especially fashion and celebrities` life. It takes about 30% of my day. **Mike:** I think that television has a negative effect – the negatives outweigh the positives. When I watch TV, I only watch football matches. **Nick:** I like TV because I can see everything with my own eyes. Besides, it`s much more difficult for politicians to lie in front of the cameras than on the pages of newspapers.

46. ***In groups ask and answer the following questions.***

- Which of the speakers do you agree/ disagree with? Why?
- How important is TV in your life?
- How do you generally feel about the latest advancements in TV technologies?

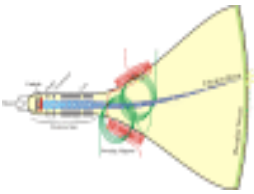
INDEPENDENT FURTHER STUDY

47. ***Television technology and other stuff. All the sentences are from the articles about television. Match the sentences with the pictures.***

a

b

c



d

e

f

g

h

1. A CRT (cathode ray tube) works by sweeping an electron beam of varying intensity across a phosphor-coated screen. 2. In some areas relay towers must amplify the signal and carry it to the next transmitter. 3. It is hard for today's generation to imagine watching TV at the time when it came to transition from black and white to colour and when there was no Smart TV or HD TV. 4. Analogue televisions without digital capability would not be able to receive a digital signal and would therefore be rendered unusable without a digital TV receiver. 5. Manufacturers release a great number of LED TV models every year including different features. 6. The first TV remote control, called "Lazy Bones," was developed in 1950 by Zenith Electronics Corporation. 7. Television satellites travel in a geosynchronous orbit approximately 22000 miles above the Earth. 8. Mounting your antenna on the roof is a great alternative for signal reception, rather than mounting it in an attic.

48*. ***Read the text below and think of the word which best fits each space. The missing words may include: prepositions, quantifiers, units of measurement or may be evident from the abbreviation.***

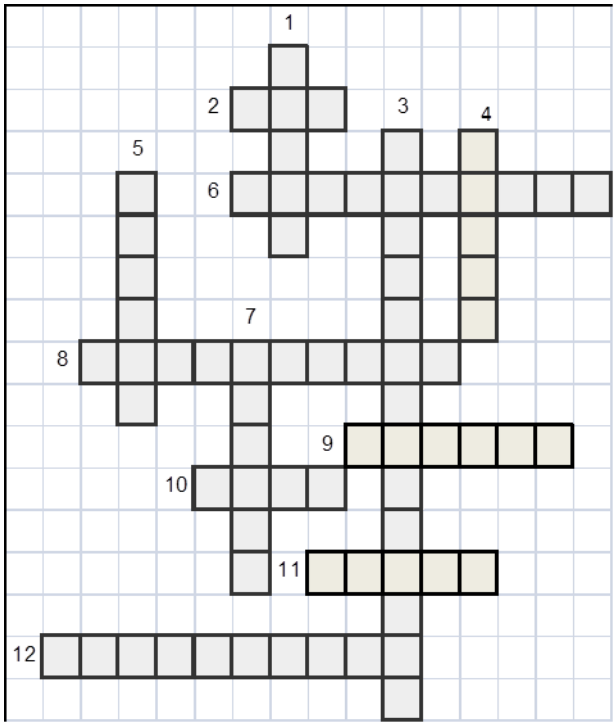
How Remote Control Works

Generally, there are two types of **remote** controls: infrared (IR), and radio (1) _____ (RF). Infrared remote controls work by sending (2) _____ of infrared light to a device, while RF remote controls use radio (3)_____ in much the same (4) _____ Pragmatically, the (5) _____ difference between the two is range. IR remote controls **require** a clear line of sight to the **receiving** device and their range maxes out at about 30 feet (9.14 meters). RF remote controls can go (6) _____walls and around corners, with a range of roughly 100 feet, that is 30.48 (7) _____ .

Most home entertainment components such as stereos, televisions and home entertainment centers use IR remote controls. The remote contains an internal **circuit** board, processor, and one or two Light (8)_____ Diodes (LEDs). When you (9)_____ a button on a remote control, it transmits a **corresponding** code to the receiving device by way of LED infrared pulses. The idea is somewhat **akin** to flashing an SOS signal, but instead of letters, the flashing LED light is transmitting a series of 1s and 0s. The "1" might be represented by a long **flash**, while "0," a short flash. A receiver, built into the component, receives the pulses of light and a processor decodes the flashes into the digital bits (10)_____ to activate the function.

49*. Complete the sentences with the words in bold from the text in exercise 48*.

1**.** While getting started with electronics, you must be thinking about making useful and simple _____. 2. She had a _____ of intuition. 3. We enjoy travelling to _____ and exotic destinations.4. The number of laboratories _____ the equipment is increasing. 5. All rights carry with them _____ responsibilities. 6. The German and English languages are closely _____. 7. These _____ access to advanced production technology.



50. ***Do the crossword.***

Across

2. Not many, not enough.

6. The first _____ (without interruption) live broadcast of a "breaking" news story in the world was conducted by the CBC.

8. Radio waves have a _____ of about two or three metres**.**

9. To make someone able to do something.

10. A CRT is a sort of vacuum _____ in which images are produced.

11. A vibration that propagates as an acoustic wave.

12. Opposite to natural.

Down

1. Opposite to above.

3. Many scientific discoveries and inventions are made independently and more or less _____ by multiple scientists and inventors.

4. Something which adjusts or configures a mechanical, electronic, or musical device.

5. To start to be seen or to be present.

7. A substance, such as water, that is not solid or a gas.

51. ***Do you know some expressions which we use to connect ideas in writing and speaking, such as 'and, but, on the contrary…'? How many words can you name? Look through Module 4 vocabulary list. Find discourse markers there. Remember how they were used in the texts. Think of some equivalents to these words.***

STUDY NOTE. Discourse markers are special words that are used to connect ideas in a text and help us understand the logical structure of what we read or listen

to. They are also sometimes called **signposts or linkers:** *It was raining outside.* ***So,*** *I decided to take an umbrella.*

52. ***Look at the list of words below. Define their meaning and function in a text. Then use them to fill in the gaps in the text. Retell the text.***

also / Firstly /This is why /So / For example / Thirdly / However / Secondly / Besides / because / And last but not least / In addition / What's more

Challenges with Text Messaging

Studies show that text messaging is quickly overtaking calls as a means of communication using mobile phones. Texting services (SMS or MMS), instant messaging apps and VoIP chats (Skype, Face Time, etc.) have become indispensable. (1)_____, they are (2) _____ fast and easy to use. (3) _____, they have a number of limitations. (4)_____**,** miscommunication happens when you do not understand emotions. (5)_____**,** short answers can come across as uncaring (безразличный) when the sender might have only been in a hurry.

(6)_____, facial expressions and tone of voice amplify the meaning of spoken words. (7) _____ tone like sarcasm is hard to discern (распознать) from a text. (8)_____**,** we often use shortened words and no capitalisation (использование заглавных букв) or punctuation especially for SMS.

(9)_____**,** many of us rely on auto-correct. (10)_____, over dependence can make us forget spelling rules.

(11)_____**,** feelings can get hurt when we don't get a response or a reaction to texts or posts immediately (12) _____ we think we are being ignored.

(13)_____**,** our digital tools are dependent upon electricity, internet connection and mobile service.

DEGREES OF COMPARISON. OTHER POINTS

STUDY NOTE. Before comparatives, we can use an intensifier to add emphasis - **much, far, very much, even,** or, to talk about small differences - **a little, a bit, slightly** etc.

Travelling by plane is much faster than by train.

After taking a medicine he began to feel a little better.

53. ***Read the texts and fill in the gaps with the words from the box. Do you agree with the opinions of the authors of these texts? Why yes/why not ?***

Two Cities

a bit more/ much more/ slightly /just as/ a bit/ completely/ much

If you visit Russia, you should definitely visit both Moscow and St. Petersburg. They are (1)_____ different cities. St Petersburg feels (2)_____ ____ European than Moscow, while Moscow is (3)__ ____ 'grittier', but very interesting. Things like accommodation, food, transport and so on are (4)_____ the same in both places. It's (5)____ easier to find a cheaper place to stay in St Petersburg, but Moscow has (6)__ ____ ____ variety when it comes to eating out. To get around, take the metro, which is (7)_____ __ efficient in St. Petersburg as in Moscow.

Working at Home Vs Working in an Office

nearly/ as much/slightly more/a bit more / just as much /much more

It is hard to compare working at home and working in an office. People think that working at home would be (1)_____ _____ relaxing, but that's not always true. You still have to do (2)_____ __ _____ work, so it can be equally stressful. Of course, you have (3) _____ _____ freedom to plan your own day, but you also have to be (4)__ ____ ____ responsible , because otherwise you end up wasting a lot of time. In the end, you save time commuting, but most people waste a little more time, so you spend (5)_____ __ _____ time working as if you just went to work.

STUDY NOTE. as + adjective + as means that the two things are equal: *His new*

novel is ***as readable as*** *all his books.*

If we want to say that **two things aren't equal**, we can say*: E-mail is* ***not as personal as*** *a handwritten note. (= less personal)*

We use **double comparatives** to say that things are changing: *Tom is getting* ***taller and taller***.

54. ***Open the brackets. Translate the sentences into Russian.***

1. The term “telecommunication” is as (old) as the Ancient World. 2. He worked (hard) and (hard) as the end of the term came nearer. 3. My message is not as (long) as yours. 3. Radio broadcast today is not as (good) as it used to be. 4. You won’t pass your test next time if you don’t work as (hard) as you should. 5. Social networks are as (important) today as television used to be. 6. As he went on, the box became (heavy) and (heavy). 7. Computer technologies appeared not long ago but they are as (successful) as other means of telecommunication. 8. He clearly did not like the explanation, and as he was listening to it, he was getting (angry) and (angry). 9. He said that the new method didn’t work as (well) as they had expected. 10. Now the days are getting (long) and (long).

STUDY NOTE. We use **the + comparative + the + comparative** to show that two things vary or change at the same time: *The more I study, the more I know.*

55. ***Correct the mistakes and translate the sentences into Russian.***

1. The much electricity you use, the higher your bill will be. 2. The sooner, a better. 3. The more I thought about the plan, the little I liked it. 4. The earlier we get going, the best. 5. The fast you drive, the much dangerous the situation is. 6. The little money you spend, the more you save. 7. The old we grow, the wisest we become. 8. The much I learn, the more I realise how much I do not know. (Albert Einstein)

56. ***Complete the second sentence in each pair so that it has a similar meaning to the first one.***

1. Last year they had a better timetable than they have now. The new timetable is

_____ as the one they had last year. 2. Over the last two centuries the world has changed faster than ever before. The world has never changed _____ it has over the last two centuries. 3. You may be surprised but hearing ultrasound is not pleasant. Hearing ultrasound is_____ as you might think. 4. All the other students in her group are not as knowledgeable as she is. She is _____in her group. 5. The weather in Moscow was not as good as in Sochi in September. The weather in Sochi was _____than in Moscow in September.

QUESTION FORMS SUMMARY

57. ***Read the following questions from Modules 1-4. How do we make up questions? What is the difference between questions and statements in the English language?***

1. How are students' academic achievements assessed? 2. What courses contribute the most to the career of an engineer? 3. What degree are you studying for? 4. What famous academics taught (or worked) at IMTS? 5. How do alternative energy sources help solve the problem of greenhouse effect? 6. Who owns the discovery of electricity? 7. How is electricity used and received? 8. Did Alexander Bell invent radio? 9. Is a Cathode Ray Tube a part of modern TV sets? 10. What waves make possible most of our everyday communication?

STUDY NOTE. In Russian we can use only **intonation** to ask questions. In English we also use **grammar** to ask questions. We divide question forms into four types.

Type 1: sentences **with am, is, are, was, or were** as the main verb. We reverse (менять на противоположный) the order (порядок) of the subject (подлежащее) and the verb.

Are you ill? Was anyone at home?

Type 2: Sentences with **auxiliary** (вспомогательный) verbs (be, have, will, can etc.). We reverse the order of the subject and the auxiliary verb.

Have seen the new film?

Type 3: Simple Present or Past Tense of all **main** verbs apart from **be**. We use a

‘dummy’ auxiliary **do or did.**

Do you like music?

PS. We can add question words (why, how, where, when, etc.) to the beginning of type1-3 questions.

Why are you angry? When will he come? Where did you buy this dress?

Type 4: The question word is **the subject** of the question. There is no change to the basic order of the words in this type of question.

What is going on? Who told you that lie?

58. ***Look at the questions from task 57. Put them into the right section in the table below.***

Type 1	*How are students’ academic achievements assessed?*
Type 2	
Type 3	
Type 4	

59. ***Read some facts from the history of the invention of television and practise asking different types of questions to the sentences below. Ask and answer the questions in pairs.***

Example: *The world's first television stations first started appearing in the late 1920s and early 1930s. → When did the world’s first television stations start appearing?*

1. The earliest experiments in television began almost immediately after the invention of the photograph in the middle of the 19th century. 2. Michael Faraday’s experiments demonstrating the relationship between light and electricity gave the idea of the electrical transmission of moving pictures. 3. A means of electrical transmission of sound had to be found. 4. A major breakthrough was made in 1873 when it became possible to convert light into electronic signal. 5. In 1883 a German engineer Paul Nipkow invented the technology to create the first

genuine television picture. 6. By 1926 radio had become a reality so, the problem of transmitting sound had been solved. 7. Zworykin developed his cathode ray tube into a television receiver. 8. In 1939 NBC began regular broadcasts. 9. After the end of WWII television began to play an increasingly important role in social and political life. 10. Nowadays television has become a major mass entertainment medium.

CHECK YOURSELF

60. ***Choose the right answer. For some questions more than one answer may be correct.***

1. What did Alexander Graham Bell invent?

A. telegraph **B**. telephone **C**. radio

2. Who first conclusively proved the existence of the electromagnetic waves?

A. Isaac Newton **B.** Heinrich Rudolf Hertz **C.** James Clerk Maxwell

3. The first radio receiver, also known as lightning detector, was invented by

A. Alexander Popov **B.** Guglielmo Marconi **C.** Nikola Tesla

4. Electromagnetic waves with lowest frequency are

A. radio waves **B.** infrared waves **C.** ultraviolet waves

5. What rays are used in a microwave oven?

A. Microwaves which are a form of X-rays light rays.

B. Microwaves as well as ultrasound which are a kind of sound waves.

C. Microwaves which are a form of electromagnetic radiation - radio waves.

6. What is the difference between radio waves and Wi-Fi?

A. WiFi works on a rather high frequency compared to traditional radio**.**

B. WiFi works on a rather low frequency compared to traditional radio.

C. WiFi technology uses sound waves..

7. Television is a device shaped like a box with a screen that receives

A. electrical signals and changes them into moving images and sound.

B. radio signals and changes them into moving images and sound.

C. sound waves and changes them into electrical signals.

8. Do you need a digital antenna for a digital TV with a digital tuner?

A. No. There is no difference between antennas used for analogue TV and antennas used for digital TV.

B. No. In fact, there is really no such a thing as a "digital" antenna. Digital TV just uses less bandwidth due to the ability to compress the signal.

C. Yes. Digital TV channels operate on other frequencies as analogue TV channels.

9. Which company launched the first mobile phone?

A. Motorola **B.** Nokia **C.** Ericsson

10. What company created the first smartphone?

A. Nokia **B.** IBM **C.** Apple

61. ***Fill in the missing letters in the words from Module 4 word list. Read and translate the words.***

1. R_l_t_ _ns; 2. br_ _kthr_ _gh; 3. br_ _ cast; 4. _ppl_c_ti_n; 5. int_gr_t_d c_rc_ _t; 6. s_t_ll_te; 7. tr_nsm_ss_ _n; 8. t_chn_que; 9. thr_ _t; 10. n_tw_rk.

62. ***Fill in the gaps in the sentences below using the words in the box.***

technique / place / push / dealing / encouraged / ancient / growing/ broadcast / lead / carry

A. 1. After the pandemic started there has been a rapidly _____demand for face masks. 2. They were receiving a live _____ from the scene of the accident. 3. The ecologists will discuss the environmental problems that might _____ to a disaster if people don't do anything to deal with them. 4. In _____ times astronomers named stars after gods. 5. Many people believe that space technologies will _____ human civilization forward. 6. Wires that _____ messages mock space and outrun time. 7. The concert takes _____ next Thursday. 8. Scientists predict a major breakthrough in _____ with the pandemic in the near future. 9. Children should be

_____to learn foreign languages at school. 10. Yoga is a very effective _____ for dealing with stress.

rise / enable / point /advances / breakthroughs / expand / transmitted / medium / effect / role

B. 11. Radio became the first electronic broadcast _____ which began to be used for mass communication. 12. Some people think that electromagnetic waves from mobile phones have a bad _____ on their health. 13. According to the research, vaccination will play an important _____ in dealing with the coronavirus. 14. Heavy rains have given _____ to flooding over a large area. 15. The information is _____electronically to the central computer. 16. The latest medical _____brought the treatment of cancer to a new level. 17. Ban on smoking in public places became a turning _____ in an anti-smoking campaign. 18. These companies need to _____ into new markets. 19. Computerisation will _____ us to cut our costs. 20. Recent _____ in telecommunications mean that people can always stay connected.

63. ***Complete the sentences with the correct form of the verbs in brackets. (Answers may vary).***

The Job Interview.

Peter had a job interview a few days ago. First the interviewer asked him what his name 1.___(be) and how old he 2.___(be).Then she asked him where he 3.___(go) to school and if he 4.___(have) any special training. She also asked where he 5.___ (work). Peter replied that he 6.___ (finish) a specialised English school, did a course in finances in college 7.___(work) at the bank for 5 years. He also mentioned that 8._____ (can) speak English fluently. Peter said that he 9.___ (do) his best to become a good specialist. He answered all the questions and hoped he 10.___ (get) a job at the company.

64. ***Put the verbs in brackets into the correct tense form. In some sentences answers may vary.***

1. His sister said she never (see) that film before. 2. When he came into the room he saw that his son (play) on his computer. 3. They were worrying because they were not sure if they (lock) the door. 4. I wanted to know when she (be able) to give me that book. 5. The waiter asked them if they (to enjoy) the meal. 6. She believed that she (finish) the article soon. 7. I am afraid they (not to come) yet. 8. He asked how far away the station (be). 9. My colleague said he (not know) who (phone) me. 10. He says he (not see) his parents for weeks. 11. She said she was sorry that she (come) so late. 12. Alex promised he never (speak) to her again. 13. They said they just (buy) a flat. 14. I decided that I never (drink) coffee late at night. 15. His wife said that he already (find) a new job. 16. They were sure that the children (sleep). 17. I don't think they still (to discuss) that problem. 18. We were glad that all the guests (gather) at last. 19. The doctor said I (be) allergic to oranges. 20. Ann hoped that she (pass) her entrance exams.

65. ***Rewrite the sentences beginning from the words given in brackets.***

Example: *The experiment went well. (The researcher reported…) → The researcher reported that the experiment had gone well.*

1. I can get home on my own. (She said…) 2. We haven`t been to the art gallery for ages. (They said …) 3. When did you leave the house this morning? (He asked me…) 4. I`ll think about it. (He said…) 5. I haven't been in touch with my mother since the end of the summer. (She said …) 6. You should cut down on smoking. (The doctor told him…) 7. Do you understand the rules of reported speech? (He asked me…) 8. When will I see you again? (She asked him…) 9. We`re going on holiday tomorrow. (They said…) 10. Wait here until I get back. (She told him…)

66. ***Put the adjectives in brackets into the correct comparative or superlative form.***

1. He had two TV sets. One of them was (old) than the other. He liked it (well), because it had a (large) screen. 2. The development of electricity led to the invention of telephone and telegraph, and (far) developments led to the wireless communication. 3. The (far) planet in the Solar system is Neptune. 4. The

distance between the (near) crests (гребни) of waves in the sea was broadcasting 10 meters. 5. Digital processing (обработка) also uses (little) power than the old analogue technology. 6. LED is (efficient) than CCFL.7. The (big) difference between infrared (IR) and radio frequency (RF) remote controls is coverage range. 8. Television uses light impulses to build the picture that we can see. If a picture is built up in (little) than a tenth of a second, the eye will be unaware that this process is even occurring.

67*. ***Read a passage from "David Copperfield" by Charles Dickens and put the verbs in brackets into the correct tense form.***

In a week's time the answer from Mr. Murdstone came, and my aunt (to inform) me that he (to come) to speak to her in person the next day. It (to be easy) to imagine with what beating of the heart I (to wait) for this day. I (to sleep) badly at night and (to wake up) early in the morning, trembling with fear. Yet I (to have) to wait. Mr. Murdstone (not to come) in the morning but only (to arrive) in the late afternoon. He (to come) with his sister who (to be) even more cruel to me than her brother. I asked my aunt if I (to have) to go away but my aunt asked me to stay. Words (can/not) describe the feeling with which I (to see) again the harsh faces of my stepfather and Miss Murdstone. Mr. Murdstone said that I (to cause) him a lot of trouble and that I (to have) a bad temper. He added that they (to try) to do what they (can) for me but (not to be able) to cure me.

(An extract from *David Copperfield* by Ch. Dickens. Adapted)

68. ***Answer the following questions. Consult Module 4 texts if necessary.***

1. What examples of the first means of communication can you give? 2. What does the word 'telecommunication' mean? 3. What were the first true telecommunication systems? 4. What discoveries did electromagnetic waves make possible? 5. What is the most popular technology for the human communication today? 6. What are the most popular mobile phone applications? 7. How does a mobile phone transmit information using mobile networks? 8. What discoveries were essential for the invention of TV? 9. What technologies

are associated with TV of the future? 10. What do the waves emitted by our physical world make possible?

MODULE 4 PROGRESS TEST

Vocabulary. Decide which answer a, b or c best fits into each gap.

The telecommunications industry is playing a major role in the economic growth. The global implementation (внедрение) of digital telecommunications equipment has (1)_____ the merger (слияние) of the traditional telecommunications (2)_____ designed for voice communications with data communications (computer information (3)_____). The resulting (4) _____ that we all know as "the Internet" has changed the society and (5)_____ the world commerce.

In today's world technical (6)_____ is occurring so (7)_____ that it is very difficult for most engineers and technicians to stay current with the enormous amount of literature produced in each discipline. Most of them can only hope to keep up with the most (8)_____ information and focus on some (9)_____ aspects in considerable detail. The practicing engineer/technician should understand how existing telecommunication systems have (10)_____ and gain an insight into their future development.

1.	a. enabled	b. enacted	c. employed
2.	a. net	web	c. network
3.	a. transit	b. transport	c. transfer
4.	a. breakthrough	b. improvement	c. step
5.	a. enabled	b. expanded	c. evolved
6.	a. application	b. relation	c. advancement
7.	a. instantly	b. rapidly	c. obviously
8.	a. essential	b. obvious	c. average
9.	a. groundbreaking	b. specific	c. amusing

10. a. expanded b. encouraged c. evolved

Grammar. Decide which answer a, b or c best fits into each gap.

1. The speaker claimed that the first true telecommunications system _____ with the successful innovation of a telegraph system.

a. had begun b. begin c. would begin

2. In 1945 Arthur Clarke suggested that satellite communications technology _____ developed.

a. was b. would be c. had been

3. According to the article, the era of the handheld mobile phone _____ in 1973, when Motorola Manager placed the first mobile phone call.

a. had started b. started c. would start

4. They _____ that the last CRT TV by a major manufacturer was introduced by LG in 2010.

a. claim b. describe c. order

5. Did you know that the first true television system _____ by Scottish inventor John Logie Baird in 1926?

a. would be demonstrated b. was demonstrated c. had been demonstrated

6. They came to the conclusion that since the invention of television history _____many firsts in the area of television.

a. saw b. has seen c. had seen

7. Do you know that after 1945 improved technology _____ to change the face of telecommunications?

a. began b. would begin c. had begun

8. The author pointed out that there _____ a few significant contributions by different people in the invention of television.

a. were b. had been c. would be

9. He _____ that the first television systems were black and white.

a. told us b. said us c. told

10. It is reported that _____ time babies spend watching television, _____ slowly they learn to speak.

a. as much….as much b. more… more c. the more…the more

MODULE 5

SMART TECHNOLOGIES

"It's still magic even if you know how it's done." - *Terry Pratchett, an English writer.*

Learning points for Module 5:

Reading:

Text A. The Age Of Computers

Text B. Just Ask Alexa

Text C. Will It Change Our Lives?

Vocabulary in context: Word definitions/ Collocations/ Synonyms/ Word forms

Grammar: Different types of Subordinate clauses

Speaking: How Smart Technologies Impact Our Lives

Skills: How to read the right way

Learning aims:

- to practise reading and speaking about computers and other smart technologies;
- to learn and practise active vocabulary related to the topic of the module;
- to learn about different types of subordinate clauses and practise to

understand and use them;

- to learn about and practise different types of reading.

Lead-in

Sentence anagrams. Write the definitions of a computer rearranging the words below. Which of these definitions is more accurate in your opinion? Think of your own definition of a computer.

A computer is …

- data / electronic / manipulates / instructions. / an / according to / machine / a list of / that.

- that / information/ works with/ to get / and / result./ a device / accepts / a / /it / particular
- following/ to /a /performs / that/ instructions./ programmable /computations/ / machine / certain

READING

Part 1

1. ***Read the text and define its main content points choosing from the list below. Confirm your answers with quotes from the text.***

1 The definition of a computer;
2 The history of computers;
3 Numerous applications of computers;
4 Generations of computers;
5 The structure of a computer system;
6 What all computers have in common;
7 What tasks computers are designed to perform;
8 The downsides of using computers;
9 The future of computing;
10 Types of computers.

Text 5A

THE AGE OF COMPUTERS

(1) Today we are living in what some people call the ‘digital age’, meaning that computers have become an essential part of our lives. We visit shops and offices which have been designed with the help of computers, pay bills prepared by computers, and make flight reservations and bank transactions with the help of computers. Just picking up a telephone involves the use of a sophisticated computer system. It is almost impossible to imagine our life without computers. But what is a computer?

(2) In general, computers are machines that perform tasks or calculations according to instructions. Since the basic job of computers is processing information, they can be defined as devices which accept information in the form of instructions, called programs, and characters, called data, perform mathematical and logical operations on this information, and then provide the results of these operations.

(3) Today there are a lot of different types of computers. However, most computers, whether large or small, have three basic capabilities. First, they have circuits[1] for performing arithmetic operations. Second, they have a means of communicating with the user. Third, they have circuits which can make decisions. So, a computer can solve a series of problems and make thousands of logical decisions. It can find the solution to a problem in a fraction of the time it takes a human being to do the job.

(4) But, what makes a computer such a miraculous device? Each time we turn it on, it is a blank slate[2], that with the appropriate hardware and software, is capable of doing anything you ask. It is a calculating machine, it is an electronic filing cabinet[3] which manages large collections of data, it is a magical typewriter that allows you to type and print any kind of document, it is a personal communicator that enables you to interact with other computers and people around the world, and you can also use it to relax playing computer games.

(5) Not only is the number of tasks you can do using a computer growing*, but the computers themselves are also getting more and more sophisticated. Compared to the first electronic computers, which were huge machines that required teams of people to operate, today's computers are amazing. Not only are they thousands of times faster*, but they have also shrunk[4] to be able to fit on your desk, in your lap, or even in your pocket. Modern computers range in size and power depending on the tasks they are designed to perform. At one end of the scale, there are supercomputers, very large and powerful computers with thousands of linked microprocessors. At the other end, there are tiny embedded[5] computers. Smartphones have turned into fully programmable computers in their own right and may well be the most common form of computers in existence.

(6) Today computers are virtually[6] in everything we touch. We still have an image of computers as being rectangular objects either on a desk, or these days in our pockets; but computers are everywhere: in our cars, TVs, stereo systems, calculators, and home appliances[7]. They are integrated into everyday life, often in an invisible way. We do need to care about what the future of computing holds because it is going to continue impacting our lives and driving the transformation of entire systems of production, management, and governance[8].

*__Note that__ after some 'limiting' adverbials (not only, hardly ever, only once, etc.) when we 'front' them (put at the beginning of a sentence) we change the order of the following subject and verb as we do in questions.

*Not only **is the number** of tasks you can do using a computer growing, but the computers themselves are also getting more and more sophisticated.*
*Not only **are they** thousands of times faster, but they have also shrunk to be able to fit on your desk.*

Vocabulary notes for text 5A

[1]circuit	схема
[2]blank slate	чистая доска
[3]filing cabinet	картотека
[4]have shrunk	уменьшились
[5]embedded	встроенный
[6]virtually	практически, поистине
[7]appliances	приборы
[8]governance	управление, руководство

2. ***Find the words in the text which have the following meanings. In pairs practice giving their definitions.***

§1

1. extremely important or necessary;

2. include (something) as a necessary or integral part;

3. well designed and very advanced, often working in a complicated way;

§2

4. in a way that follows certain rules;

5. a process of dealing with information using a computer;

6. (to) explain the meaning of a word;

7. (to) take something that is offered;

8. signs used on a computer;

§3

9. abilities, skills or powers;

10. a way (method) of doing something;

12. dealing with a problem;

§4

13. very good and unexpected;

14. correct or suitable for a particular purpose;

15. computer machinery and equipment;

16. computer programs that make it work;

17. a machine designed to print on paper;

§5

18. in relation to something;

19. needed;

20. a range of different types of things, from the lowest level to the highest;

21. very small;

§6

22. describing something that cannot be seen;

23. having an effect on something;

24. all the amount, whole.

3. ***Read the text again and answer the following questions.***

1. What does it mean to be living in a digital age? 2. What examples of computer usage can you give? 3. What is a computer? 4. What is the most important function of a computer? 5. What remarkable powers do computers have? 6. How are modern computers different from the first electronic machines? 7. What types of computers are there? 8. Where can you find embedded computers? 9. What devices may be the most common form of computers today? 10. Why can we say that computers are virtually everywhere? 11. What does the future of computing hold? 12. What do you use a computer for?

4. *Complete the sentences using the information from the text without looking into the text.*

1. Living in the digital age means _____ . 2. It is impossible to imagine our life without computers because _____ . 3. A computer is a device which _____ . 4. Three basic capabilities of computers are: _____ . 5. Computers are capable of doing what we ask them to do with appropriate _____ . 6. Not only are modern computers thousands of times faster than old machines but they _____ . 7. Smartphones have turned into _____ . 8. We need to care about what future of computers holds because _____ .

5. *Explain how you understand the phrases from the text. Think of your own examples to illustrate these points.*

§2 The basic job of computers is processing information.

§4 Computers are miraculous devices.

§5 They (computers) have shrunk to be able to fit on your desk.

§5 Smartphones have turned into fully programmable computers in their own right.

§6 They (computers) are integrated into everyday life, often in an invisible way.

§6 They (computers) continue driving the transformation of entire systems of production, management, and governance.

READING

Part 2

6. *In pairs / groups, talk about these words from Text 5B. Explain their meaning*

or translate them into Russian. Use a dictionary if necessary.

Technology / healthcare / virtual / assistant / capabilities / queries/ software / experts / advice / response / reliable / pharmacists / a patient / software / protection.

7. ***You are going to read about Alexa, a virtual assistant used in healthcare. Read the headline. Guess if 1-6 below are true (T) or false (F).***

1 The article says healthcare has taken a step towards helping technology.
2 We won't be able to ask Alexa for health advice.
3 Everyone praised the new Alexa's health advice function.
4 Alexa could reduce pressure on hardworking doctors.
5 People say we should see a doctor for serious health problems.
6 A data protection group said Alexa could be a disaster for our privacy.

8. ***Read the text and check your answers.***

Text 5B JUST ASK ALEXA

(1) Technology has taken another step in helping us with our healthcare. We can now ask the digital device Alexa for advice if we are worried about our health. Alexa is a virtual assistant created by the website Amazon.com. It is capable of listening to people and answering their questions. As well as voice interaction capabilities, Alexa can make to-do lists, play music upon voice request, and give us the latest news. Now Alexa can answer our health queries. Amazon has linked up with the National Health Service (NHS) in the UK to add a health advice capability to the software. Alexa is able to search the NHS website for information and find an answer that is agreed on by many health experts.

(2) Alexa's new health advice capability has been met with a mixed response. Some people think that technology like this is a great example of how people can access reliable, world-leading advice from the comfort of their home, reducing the pressure on our hardworking doctors and pharmacists. Other people say we need to be careful about trusting the advice of a piece of software. They say we must go to

a human doctor if we have serious health problems. Other people are concerned about privacy. The group Big Brother Watch is worried about hacking. It said: "It is a data protection disaster waiting to happen."

9. ***Read the text again and match the words with their definitions using the context.***

§1

1. step	a. not physically real, but made by software to look real.
2. device	b. action taken in order to reach a goal.
3. virtual	c. a helper.
4. assistant	d. having the ability, fitness, or quality necessary to do or achieve something.
5. capable	e. a thing made or changed for a particular purpose, especially a piece of mechanical or electronic equipment.
6. linked up	f. someone who knows everything about a topic.
7. expert	g. joined with something or someone else to do something together.

§ 2

1. mixed response	a. to get to use something.
2. to access	b. showing or believing in a person's honesty or sincerity.
3. reliable	c. good and bad feelings from people about something.
4. pressure	d. always good in quality or performance; able to be trusted.
5. trusting	e. a sudden event that causes great damage or loss of life.
6. privacy	f. conditions of work or a way of living that cause anxiety or difficulties.
7. disaster	g. the state or condition of being free from being looked at by other people.

10. ***Answer the questions using the text.***

1. What is Alexa? 2. How can Alexa help people? 3. What service has been linked to Amazon to provide health advice? 4. Why is the health information from Alexa reliable? 5. What kind of response did Alexa's health advice get? 6. Why do some people say we need to be careful while using Alexa's advice? 7. Is it a good idea to follow Alexa's health advice in case of a serious health problem? Why? 8. What is the other concern about using Alexa?

11. ***In turn summarise the information in text 5B. Use key words from Tasks 6 and 9 as prompts.***

12. ***Discussion. Work in pairs. Students A strongly believe Alexa is a great way of getting healthcare advice; Students B strongly believe the opposite. Change partners again and talk about your ideas.***

READING

Part 3

13. ***In groups think of some recent computer technologies which you think are the most important today. Explain why.***

14. ***Scan text 5C and check if the technologies described in the text were on your list.***

Text 5C

WILL IT CHANGE OUR LIVES?

One innovation that is with us to stay is AI (Artificial Intelligence) and with it, smart technology. Smart technology makes use of AI to enable a level of cognitive awareness to devices and applications. The technology employs machine learning and big data analysis to perform functions that have traditionally been carried out by humans. In doing so, it rapidly boosts the efficiency, productivity, and functionality of modern devices.

Artificial intelligence is the area of computer science that deals with the development of intelligent machines capable of performing tasks usually done by humans. The term 'Artificial intelligence' was coined in 1956 by John McCarthy at MIT. AI includes programming computers to make decisions in real life situations, e.g. expert systems that help doctors in the diagnosis of diseases based on symptoms. Other examples include programming computers to understand human languages, to play games, to react to sensory stimuli (robotics), etc. The potential applications of AI are beyond imagination. People tend to rely more on smart machines for difficult tasks and complicated projects that require certain levels of precision. AI is still in its initial stage of development and therefore requires some human interaction. Even at its current state, it is capable of performing many tasks better and more efficiently than humans ever could.

Machine Learning. For a machine to be intelligent it has to learn how to process data, and there has to be a way to do so. Machine learning (ML) is the method of making computers learn and think as humans do. Machine learning is becoming so popular today because all you need to know to make it work is the nature of a problem and its ideal answer. Then ML works like magic to solve the problem for you based on similar problems with correct answers you provide it with. Machine learning involves the use of machine learning algorithms and models. A procedure that is run on data to create a machine learning model is called an algorithm. Machine learning algorithms build a model based on sample data, known as training data, in order to make predictions or decisions without being explicitly programmed to do so. A model in machine learning is the output of a

machine learning algorithm run on data. As a result of what machines learn from the data they are trained on, operations are optimised, intelligence is developed, and predictions can be made.

Big Data is a large volume of data collected from various sources, which contains a greater variety and a large amount of information from millions of users. The more various data we use, the better the accuracy of the Machine learning models trained on this data is. Although more data is good, it is not useful if it does not contain variety. Usually, big platforms collect large amounts of data from user interactions in order to improve their services. Most of this data is encrypted and saved anonymously. However, there are downsides to these collections. In recent years, there has been a major concern over privacy and security of users' data. Most companies have now updated their privacy policies and imposed strict rules on data collection and have given more power to their users in deciding what can be collected.

As stated earlier, ML, AI, and big data are not quite the same, but they have one thing in common – they are all data-driven technologies. Because of the pace at which AI is advancing, some researchers predict that one day it may replace the human workforce completely. However, the likelihood of eliminating humans is distant. As of now, the most advanced AIs are of the narrow AI type, which means they only excel at performing a single type of task, unlike humans who are smart and flexible enough to perform a large number of tasks with high accuracy.

15. ***Read the text and circle any words you do not understand. In groups, make a list of unknown words and use dictionaries to find their meaning.***

16. ***Read the text again and write 10 questions to the text. In groups ask and answer these questions.***

17. ***Work in groups of three. In turn tell your group mates about one of the technologies from text 5C. Search the Internet to find more information about the technology you have chosen to speak about and provide some examples of where and how it is being used.***

18. ***Listen to the conversation about Artificial Intelligence and how it might change our life. Note down some ideas and useful words for speaking about AI.***

https://www.bbc.co.uk/learningenglish/features/6-minute-english/ep-150219

or: https://www.youtube.com/watch?v=PhnF2lhKypc

19. ***Find the information and prepare to tell your group about some other applications of AI in daily life, e.g. in smart phones, transport, entertainment, at home, etc.***

E.g.: **https://www.edureka.co/blog/artificial-intelligence-applications/**

20. ***Discussion. Work in pairs. Students A strongly believe that Artificial Intelligence will change our life for the better; Students B strongly believe that AI is a threat to our existence. Change your roles and discuss the opposite ideas.***

VOCABULARY

Module 5 Word List

Essential Vocabulary	29.store (v) (data)
1. accept (v)	30.supercomputer (n)
2. amazing (adj)	31.turn (v) into
3. appropriate (adj)	**Additional Vocabulary**
4. assist (v) / assistant (n)	32.according to
5. calculate (v) /calculation (n)	33.algorithm (n)
6. capable (adj) / capability (n)	34.artificial (adj) intelligence (n) / AI
7. character(s) (n)	35.be concerned (v) with
8. compare (v) /compared to	36.be linked (v) up with
9. define (v)/definition (n)	37.care (v) about
10.design (v, n)	38.complete (v)
11.drawback (n)	39.control (n, v)
12.embedded/built-in (adj)	40.data (n)
13.entire (adj)	41.downside (n)

14.essential (adj)	42.draw (v) attention (n)
15.hardware (n)	43.generation (n) of computers
16.however (adv)	44.impact (v, n)
17.latest/recent	45.invisible (adj)
18.(a) means (n) of	46.involve (v)
19.numerous (adj)	47.machine learning (n)
20.ordinary (adj) (computer)	48.miraculous (adj)
21.perform (v) instruction(s) (n)	49.predict (v)
22.process (v) (data)	50.pressure (n)
23.recognise (v)	51.privacy (n)
24.require (v) /request (n)	52.query (n)
25.respond (v) / response (n)	53.rely (v) / reliable (adj)
26.scale (n)	54.step (n) forward
27.software (n)	55.tiny (adj)
28.solution (n)	56.virtually (adv)

21. ***Look at the words below. Give their definitions and try to recall how they were used in text 5A.***

Essential, to involve, sophisticated, according to, processing, to define, to accept, character(s), capabilities, circuit, a means of, solution, appropriate, hardware, software, compared to, (to) require(d), scale, tiny, embedded, virtually, invisible, to impact, entire.

22. ***Read the sentences below and identify the key words and expressions from Exercise 21. Translate the sentences into Russian.***

1. Water is essential for our well-being. 2. Final year students are involved in research projects at our university. 3. Modern technologies are becoming increasingly complicated and sophisticated. 4. According to the report most people do not take enough exercise. 5. Processing is the act of performing a particular series of operations on information. 6. A capability is the ability to do things and choose a

way of life according to one`s personal values. 7. One of the major advances in computing power came with the introduction of the integrated circuit. 8. A solution to a problem is a way of dealing with it. 9. Hardware and software must work together for a computer to work effectively. 10. The aircraft is designed to be invisible to a radar. 11. The anti-smoking campaign made quite an impact on young people. 12. I spent the entire month writing this report. 13. The last two paragraphs make the conclusion virtually certain. 14. Learning to drive requires a lot of practice. 15. One of the best ways of learning a new word is to define the meaning of this word and give an example of how to use it. 16. I did not want to go to the party but I had to accept his invitation. 17. Examples of characters include letters, digits, punctuation marks, and white space. 18. This film is not appropriate for small children. 19. The road to St. Petersburg is quite busy compared to others. 20. If you require any further information, call this phone number. 21. There are scale models of famous buildings in this museum. 22. The examples of embedded systems include digital watches, electronic calculators, and fitness trackers.

23. ***Match the words (1-7) and (a-g) in columns A and B to make up word combinations. (Sometimes more than one choice is possible). Make up your own sentences with these expressions.***

Example: *An integrated circuit is an electronic device consisting of many miniature elements on a single chip.*

A.		**B.**	
1. integrated	a. a theory	1. to define	a. transport
2. on a large	b. feature	2. a means of	b. ink
3. essential	c. scale	3. appropriate	c. rules
4. sophisticated	d. circuit	4. invisible	d. an economy
5. according to	e. data	5. to impact	e. a solution
6. to process	f. attention	6. entire	f. behaviour
7. to draw	g. technology	7. to find	g. world

24. ***Fill in the gaps with the words given in the table below.***

According to / capability / involve(s) / to define / characters / solutions / essential / accept(ed) / sophisticated.

A. 1. Education is one of the _____ aspects of life. 2. The job of a computer engineer _____ problem solving skills. 3. A _____ system is a system developed to a high degree of complexity. 4. _____ __the instructions you`ll need to check new files for viruses. 5. It is very difficult __ _____ a concept of beauty. 6. After a lot of thought he _____ their invitation. 7. Examples of _____ include letters, numerical digits, punctuation marks and white space. 8. When a computer opens a file it is an example of its _____ to do so. 9. The ability to find _____ to practical problems is important in life.

Virtually / entire / hardware / require(s) / impact / appropriate(ly) / compared to / essential / invisible / software

B. 10. To dress neatly and _____ is one of the job requirements in our office. 11. Essentially computer _____ controls computer _____ . 12. Winters have become very warm _____ ___ the ones we had in the past. 13. Most projects _____ a lot of money. 14. _____ nothing has been done so far to solve this problem. 15. Good programming skills are _____ for a software engineer. 16. These bacteria are _____ without a microscope. 17. Computers have had a significant _____ on the way we study. 18. We are responsible for designing the _____ project.

25. ***Look at the words below. With your partner, try to recall how they were used in text 5B.***

Technology, device, lists, queries, linked up to, agreed, mixed, great, pressure, control, serious, happen, step, privacy, capable, latest, search, disaster, example, piece, experts, comfort.

26. ***Match the words (1-10) in columns A and B with their synonyms (a-j). Use***

the texts from Reading section to explain the meaning of the words in the left hand column.

A.		**B.**	
1. step forward	a. trustworthy	1. available	a. complex
2. worried	b. major	2. matter	b. built-in
3. latest	c. drawback	3. to control	c. carry out
4. link up	d. advance	4. capable	d. ready for use
5. response	e. reaction	5. sophisticated	e. information
6. reliable	f. stress	6. ordinary	f. able to do
7. pressure	g. concerned	7. to require	g. issue, concern
8. serious (problem)	h. surprisingly wonderful	8. to complete	h. to manage
		9. data	i. to need or want
9. downside	i. most recent	10. embedded	j. typical, traditional
10. miraculous	j. combine		

27. ***Rewrite each sentence below replacing one of the words by the word in brackets so that it will have a similar meaning to the first sentence. Translate the sentences into Russian.***

Example: *The software allows experts to study the application of any word in a variety of texts. (usage) → The software allows experts to study the usage of any word in a variety of texts.*

1. If you want to be able to talk about complex topics in English you need to improve your skills. (sophisticated) 2-3. More money is needed to carry out the program of renovation. (require, complete) 4. All the textbooks from the list can be found in the library. (available) 5. I think fathers must be able to look after their children. (capable) 6. I'm afraid he has no experience in managing large projects. (control) 7. Could I talk to you about a personal issue? (matter) 8. The story is about a typical family from a big city. (ordinary)

28. ***Rewrite each sentence below replacing the underlined words by the word in***

the box so that it will have a similar meaning to the first sentence. Translate the sentences into Russian.

Example: *Education is one of the most important aspects of modern life. → Education is one of the essential aspects of modern life.*

step forward, worried, latest, link up, response, reliable, pressure, serious

1. It is important to have a friend who is a trustworthy person, someone you can share your secrets with. 2. If you combine these pieces of information you will get a full picture of the situation. 3. Recent advances in medicine were made possible thanks to the modern technology. 4. One of the most important professional skills today is to be able to perform well under stress. 5. The lack of clean drinking water is a major problem today around the world. 6. Because of the advance of AI lots of people are concerned about losing their jobs. 7. Crying at a sad film is an emotional reaction to the drama that is taking place on the screen.

29. ***Use the word given on the right to form a word which fits in the gap.***

Much of what people do is (1) ___ problems and making decisions. Often when they face a problem their decision (2) ___ upon their previous experience. But the (3) ___ of a decision that seemed to work before does not always help (4) ___ a new task. If you don`t get out of your (5) ___ zone while (6) ___ to challenges, you won`t learn anything. Though sometimes (7) ___ on ready-made decisions is not bad, in most life situations you need to learn (8) ___ decision making skills. One of them is to be able (9) ___ the problem and understand how it is different (10) ___ to the previous ones. Only then you will be (11) ___ to select an appropriate approach to resolve the problem and (12) ___ your task.	1. to solve 2. to depend 3. to use 4. completion 5. comfortable 6. to respond 7. to rely 8. application 9. definition 10. to compare 11. ability 12. performance

30. ***Work in groups. Make 10-15 sentences with the words from vocabulary section. Write them on cards using gaps instead of the key words. Exchange your cards with other groups and do the gap filling exercise. Check your answers.***

SPEAKING AND DISCUSSION

31. ***Answer one of the questions below and give some examples from your personal experience. While speaking, use as many words from vocabulary section as you can.***

1. What are the benefits of modern technology?
2. Are there any negative sides of smart technologies?
3. Should we fear the advance of AI?
4. Do computers make us stupider?
5. What is your favourite mobile app and why?
6. Are we addicted to smart phones?

32 a. ***Match the examples of computer use in column A with the areas of application in B. Sometimes more than one answer is possible.***

A.

1. calculating a distance to a target
2. identifying an employee by his or her voice
3. analysing blood tests
4. controlling the temperature of a washing machine
5. warning when aircraft is too close
6. coordinating information from all parts of war-zone
7. using bar codes to identify items and prices
8. producing scale models of new designs
9. checking credit cards used for payments
10. issuing seat numbers
11. storing employees' records
12. monitoring the safety of each stage in the process
13. monitoring the life signs of a patient

B.

a. hospital

b. airport

c. supermarket

d. design

e. security

f. library

g. military

14.comparing fingerprints h. the home

32 b. ***Choose one of the areas from column B and prepare to talk about the use of computers in this area in more detail. Search the Internet for some examples to illustrate the application you chose.***

33. ***Use the cards below to prepare for a role-play exercise. In your group decide which application is the most useful/least useful.***

Role A – Health Advice

You think that the best use of digital devices is providing health advice. Give three reasons why. Comment on other speakers' opinions. Tell the others why you do not agree that the applications they have talked about are more important than yours.

Role B – Home Security

You think that the best use for digital devices is home security. Give three reasons why. Comment on other speakers' opinions. Tell the others why you do not agree that the applications they have talked about are more important than yours.

Role C – Homework

You think the best use for digital devices is helping you with doing homework. Give three reasons why. Comment on other speakers' opinions. Tell the others why you do not agree that the applications they have talked about are more important than yours.

Role D – Entertainment

You think the best use for digital devices is entertainment. Give three reasons why. Comment on other speakers' opinions. Tell the others why you do not agree that the applications they have talked about are more important than yours.

GRAMMAR

SUBORDINATE CLAUSES

Lead-in

Look at the sentences below and explain what the difference between a 'sentence' and a 'clause' is.

George says	that	he wants to start his own business.
I haven't yet seen the film	which	everyone is talking about.
↓	↓	↓
main clause	**linking word**	**subordinate clause**

STUDY NOTE. When a sentence is made up of two or more sentences, these sentences are called **clauses**. A **main** clause is a group of words that can stand on its own. A **subordinate** clause is a particular kind of a group of words that we attach in some way to a main clause. A sentence composed of a main clause and one or more subordinate clauses is called a **complex** sentence.

34. ***Study the table below and answer the questions.***

1. What types of subordinate clauses are there?
2. How do we identify different types of subordinate clauses?
3. What words are used to connect subordinate clauses to main clauses?

	Main clause	Linking word	Subordinate clause
Noun (object) clause	I believe	(that)	he is coming tomorrow.
Adverbial clause	They left	when	we arrived.
Relative clause	I'd like to have an app	which	can hide other apps.

STUDY NOTE. A clause which functions as a noun within the main clause is called

a **noun** (also object) subordinate clause; a clause which functions as an adjective is called a **relative** or **attributive** (also adjective) subordinate clause; a clause which functions as an adverb is called an **adverbial** (also adverb) subordinate clause.

RELATIVE CLAUSES

STUDY NOTE. Relative clauses provide information about something or someone and are similar in function to adjectives. They answer the question 'what or what kind of'.

I'm looking for a laptop *which is fast and powerful but not very expensive*.

Most often relative clauses are attached to the main clause with the help of relative pronouns: **who (whom, whose), which, or that.**

35. ***Read these sentences and decide which relative pronouns refer to people, things, or both. Complete the table.***

1. We visit shops and offices which have been designed with the help of computers. 2. Charles Babbage was an English mathematician who designed a calculating machine which was able to compute. 3. In general, computers are machines that perform certain tasks according to a set of instructions, or programs. 4. The student that is now doing a presentation has won a scholarship. 5. John McCarthy, whose name is associated with Artificial Intelligence, was an American computer and cognitive scientist. 6. IBM is an international company whose branches operate in many countries. 7. The security engineer whom we consulted gave us a few useful recommendations.

_____	refer(s) to people.
_____	refer(s) to things /animals.
_____	refer(s) to people and things.

36. ***Choose the correct relative pronoun (who, whom, which, that, whose).***

1. This is the app _____ was installed on my computer. 2. There are many people _____ believe that computer skills are absolutely necessary today to succeed in life.

3. A person ____ gets into other people's computers without permission is called a hacker. 4. Before setting a password, consult the list of the top most common passwords ____ hackers use. 5. If you are worried about computer security, consult a security engineer ____ can help you protect your information. 6. The device _____ is used to store information is called a storage device. 7. Computer engineers _____ create and test software are called software engineers. 8. A designer _____ project won is one of the youngest participants in the competition. 9. A software company is a company _____ primary products are various types of software. 10. A cache is a data storage layer in _____ data is stored so that future requests for that data can be served faster. 11. I have just met a colleague with _____ we are going to write a new program. 12. A computer is a machine _____ performs four general operations: input, storage, processing, and output. 13. Computer productivity is determined by programs _____ are step by step instructions telling the computer what to do. 14. A digital signature ensures that the information _____ you received was not altered. 15. Any user _____ is interested in registration can use this service.

Sometimes the words **when, where,** or **why** can act as relative pronouns.

37. ***Read these sentences and complete the table below.***

1. It was one of those days when everything went wrong.
2. Memory is the space in the computer where data and instructions are stored.
3. The faulty device could be the reason why your computer shuts down and then freezes.

_____ is used after place words.

_____ is used to explain the reason.

_____ is used after time words.

38. ***Fill in the gaps with who, which, whose, where, when or why.***

1. He marked the point on the map _____ we should turn left. 2. I have some letters _____ I must answer. 3. He was the first student _____ completed the task. 4. To the north of the Arctic Circle there is no sunset or sunrise at least one day

of the year, _____ the polar day or the polar night persist for 24 hours. 5. Herbert George Wells, _____ term "time machine" is now almost universally used, published the novel of the same name in 1895. 6. Nobody knew the student _____ had won the competition. 7. Our grandparents lived at the time _____ radio shows were popular. 8. The software engineer _____ fault was that the program did not work was fined. 9. A flash card, which is sometimes called a memory stick, is a device _____ data can be stored. 10. One of the reasons _____ flash cards have replaced floppy discs is that they do not require a special disc drive to be used.

39. ***Combine the following pairs of sentences using a relative pronoun***.

Example: *This is Ann. She was my best friend at school.→ This is Ann who was my best friend at school.*

1. Most of Shakespeare's plays are still popular today. He wrote them more than 400 years ago. 2. Sochi is a famous Russian seaside and ski resort. I`ve always wanted to go there. 3. The museum is closed on Mondays. We were going to visit it. 4. I bought my laptop long time ago. The laptop has died. 5. Mike had friends at school. He is staying in touch with only few of them. 6. You asked me to get you a cup of coffee. Here`s the coffee. 7. Our teachers say that reading books is really useful. They make you think about things. 8. Our project leader is getting back to work. I am doing his job. 9. One of the tips for learning new words is to read English books. I find it really useful. 10. My friend says that she hasn`t seen her parents for a long time. My friend is from Vladivostok. 11. Joanne Rowling is a famous British writer. She wrote Harry Potter children's book series. 12. My colleagues suggested a new technique for detecting bugs. This is a useful technique. 13. A Smart TV is a television set. It allows users to stream music and videos, browse the Internet, and view photos.14. The word "dexterity" is used by robot manufacturers. They describe their robots as dexterous. 15. Brain-computer interface is a computer-based system. It accepts brain signals, analyses them, and translates them into commands.

40. ***Give the definitions of the following words using relative pronouns or***

adverbs.

Example: *A builder is someone who builds houses.*

1. a computer 2. machine learning 3. Big Data 4. viruses 5. AI 6. the Internet
7. smart technology 8. an office 9. a keyboard 10. a robot 11. an author

41. ***Study the sentences. In which sentence can we omit 'that'? Do you know why?***

a) The travel guide that I bought at the airport is very useful.

b) The travel guide that is there on the shelf is very useful.

STUDY NOTE. *Who/which/ that* are often omitted when used as the object of the defining[1] relative clause. In sentence a *that* refers to 'travel guide'. It is the object of the relative clause and can be omitted:

The travel guide I bought at the airport is very useful.

In sentence b *that* is the subject of the relative clause and cannot be omitted.

The travel guide that is there on the shelf is very useful. (Not 'The travel guide is there on the shelf is very useful.')

[1]**Defining** relative clauses give the information that is **essential** for understanding a sentence.

42. ***In what sentences the relative pronoun can/cannot be omitted? Explain why.***

Example: *1. Here is the report (that) he brought us yesterday.*
2. She is the woman (that) was promoted to sales manager last week.
(Answer: 'that' in 1 is an object and can be left out, 'that' in 2 is a subject and cannot be left out)

1. That`s the woman who lives next door. 2. Our doctor is a person whom I really respect. 3. The job that he got wasn`t very interesting. 4. That`s the man whom I wanted to see. 5. I`m sorry for the people who haven`t got a sense of humour. 6. A software engineer is a computer specialist who creates software solutions. 7. He is always telling you things which you already know. 8. They never thanked me for the money that I sent them. 9. Have you got a pen that I can use? 10. I`ve never met

people who don`t eat meat. 11. The doctor who treated me didn`t know what he was doing. 12. I need a computer that has access to the Internet. 13. Steve Jobs had ideas that changed the world. 14. It`s a new app that solves math problems. 15. Do you know any app that can help you practise grammar and vocabulary?

ADVERBIAL CLAUSES

STUDY NOTE. Adverbial clauses are a category of subordinate clauses that tell us **how, where,** or **when** something described in the main clause happens.

He was so tired that he couldn't concentrate. (result)

She was late because she overslept. (reason)

They got up early in order to come on time. (purpose)

They enjoyed their walk although it was raining. (concession)

43. ***Read the text about how technology has transformed our life paying attention to the adverbial clauses and linking words.***

Revolutionary Technologies

Technology has revolutionised the way people communicate, linking humans in a real-time network across the globe. Since mobile phones were introduced in the late 1980s, their capabilities have continued to increase. The rise in communications technology is so fast that we can't follow it. It is indeed a godsend as it allowed users to stay connected even if they are located on the other side of the world and away from their computers.

Bluetooth has further increased the communicative value of cell phones, because it allowed talkers to carry on their conversations hands-free with the use of a small, one-sided headset. Moreover, as technology has evolved, Bluetooth speeds have increased. Likewise, improvements and additions are constantly being made to existing devices in order to maintain the highest quality of communication possible. Although email is not brand new, there are definitely new and innovative ways for accessing this tool remotely and without the usage of a computer. Technology has

changed communication in many ways, and some of them are not for the better. While some of these negative effects are relatively minor, in some cases they have had profound effects on the lives and well-being of users.

44. ***Complete the table with the examples of clauses from the text.***

Time	Since mobile phones were introduced in the late 1980s,
Result	
Reason/cause	
Purpose	
Contrast/concession	

45. ***Match the type of clause with conjunctions. Write your own examples for each type of adverbial clauses with different conjunctions. Discuss your sentences in mini groups.***

Clauses of	**Conjunctions**
contrast/concession **purpose** **reason/cause**	a) as, since, because of, for, the reason why, on the grounds that, due to, owing to, in view to, given; b) after, as long as, as soon as, just as, once, since, before, by the time, when, while, until/till, the moment (that), whenever, every time, immediately, the first time, the last time, the next time; c) although/even though/though, despite, in spite of, despite of the fact that…, while, whereas, on the other hand, yet, nevertheless, however, no matter how;

result	d) to, in order to, so, so that, with a view to, with the aim of, in case;
time	e) such/so…that, consequently, for this reason, thus, therefore, so, such a(n), as a result, therefore, consequently.

46. ***Complete the sentences using one of the words from the tables. Translate the sentences into Russian. In some examples it is possible to have more than one correct answer.***

Therefore, in order (to), that's why, though/although, so, consequently, while, because, as soon as, by the time.

A. 1. They had finished the experiment _____ the lab assistant came. 2. The secretary contacted me _____ to remind me about the meeting**.** 3. I never used to play computer games when I was at school _____ now I do. 4._____ they are rich, they are not happy. 5. She went to the seaside in summer _____ she wanted to swim in the sea. 6. Our teacher gave us an interesting task to do, _____ we lost track of time. 7. A computer is a sophisticated machine, _____ it can perform complex procedures. 8. Computers can be generally classified by size and power, _____ there is a considerable overlap. 9. The central processing unit contains all the circuits needed to process data, _____ it is called the 'brain' of a computer. 10. I haven't installed an antivirus software on my computer, _____ it has been infected.

On the one hand/on the other hand, in order (to), that's why, in spite of/despite, though /although, so, while, consequently, as, with the aim of, as long as.

B. 11. _____ to improve your English you should practice regularly. 12._____ my new mobile phone is not very expensive, it is really good. 13. _____ you

promise to be careful while driving you can drive my new car. 14. _____ a mouse and a keyboard are the most commonly used input devices, there are also other devices that can be used to input data into the computer. 15. Such devices as a mouse or a monitor are attached to a computer, _____ they are called peripherals. 16. _____ preparing for the conference, I was reading articles about smart technologies. 17. A lot of work is being done _____ of improving study facilities at our university. 18. _____ he had not studied hard, he failed his exam. 19. _____ of the law, people continue to use mobile phones while driving. 20. _____, I'd like to have a well-paid job. _____, I want to have a job that I would really enjoy doing.

INDEPENDENT FURTHER STUDY

DEFINING VS NON-DEFINING RELATIVE CLAUSES

47. ***Look at the following pairs of sentences. Which of the two gives extra information about the person or thing it refers to?***

1. a) Memory is the space in the computer where data and instructions are stored. b) A new computer system, which is very sophisticated, has been installed in our office.

2. a) Charles Babbage was an English mathematician who designed the first ever digital computer. b) Charles Babbage, who designed the first ever digital computer, was an English mathematician.

STUDY NOTE. Relative clauses which give information that helps to **identify** the person or thing we are talking about are called **defining** (*a- sentences* above).
Relative clauses that give some **extra** information about the person or thing we are talking about are called **non-defining.** The information is not needed to identify that person or thing. (*b-sentences* above)

48. ***Analyse the examples below. Which relative clauses are defining and which are non-defining? Explain why.***

1. This is the colleague who helped me when I was in a difficult situation. 2.

Moscow, which is the capital of Russia, is one of the world's top centres in high-tech and creative industries. 3. Our guide, who had been living in Moscow for 40 years, told us a lot of interesting things that he knew about from his personal experience. 4. Most websites use cookies and other tracking technologies which are supposed to improve our browsing experience. 5. Steve Jobs, whose innovative ideas changed our lives, dropped out of university after one semester. 6. This smartphone, which I bought last week, takes great photos. 7. Buckingham palace, where the Queen of England lives, is one of the top tourists' attractions in London. 8. The town where you were born is called your home town. 9. BMSTU, where I study, is one of the top Russian technical universities. 10. Next year we start a number of specialised courses which are essential for future computer engineers.

49. ***Choose either 'defining' or 'non-defining' to fill in the gaps.***

_____clauses are not set off from the main clause by commas.

The relative pronoun *that* is not used in _____ clauses.

In _____ clauses the pronouns *who* and *which* cannot be omitted.

50.* ***Fill in the gaps with the correct relative pronouns or adverbs. Write D (for defining), ND (for non-defining) and say whether the relative pronouns can be omitted or not.***

Example: *The books ___ I like best are the books by Jack London.→ The books <u>that</u> I like best are the books by Jack London. (D-can be omitted)*

Peter, ___ brother lives in Paris, has gone to France. → Peter, <u>whose</u> brother lives in Paris, has gone to France. (ND-cannot be omitted)

1. Compared to the first electronic computers, _____were huge machines, today`s computers are amazing. 2. Big data, _____ also contains a great variety of information about millions of users, is a large volume of data collected from various sources. 3. Programming language is a language _____ is used to give instructions to computers. 4. Machine learning, _____ is closely related to computational statistics, focuses on making predictions using computers. 5. We visit shops and offices _____engineers have designed with the help of computers. 6.

‘Big data’ is a new term _____ is widely used in every section of science and industry. 7. In general, computers are machines _____ perform calculations according to a set of instructions, or programs. 8. A computer, _____ is a calculating machine, is also an electronic filing cabinet. 9. Electronic health records, _____ are used in medical industry, allow doctors to coordinate the health care and avoid mistakes. 10. My computer, _____ I use every day, is an Apple iMac.

That

That can be a determiner, a pronoun, or a conjunction.

That ad should be deleted without opening it.

That is why I’ve called another meeting.

This is the application that I told you about yesterday.

That can also be used to refer to a particular person or thing that has just been mentioned.

His own opinion was different from that of his colleagues.

51. ***Read the sentences. In each sentence the word ‘that’ is missing. Fill in the missing word ‘that’ in each sentence***.

1. His own experience is different from of his friends. 2. She said she’d come. 3. Is house across the road really yours? 4. Our record exceeded of the most developed countries. 5. Charles Babbage was an English mathematician who designed a calculating machine was able to compute. 6. I can’t believe he’s passed the driving test. 7. Doesn’t it remind you of old house in Oxford? 8. Modern computers range in size and power depending on the tasks they are designed to perform. 9. The letter I got yesterday was from my old friend. 10. She's never been involved in something as exciting as contest.

ADVERBIAL CLAUSES OF TIME

STUDY NOTE. We use time clauses to say **when** something happens.

52. ***Use the words in the brackets to combine the following sentences.***

Example: *She was listening to the music. She could think about her wedding.→ While she was listening to the music she could think about her wedding.*

1. A small enough electromechanical computer was invented. It became possible to use this type of computer on a submarine. (as soon as) 2. The Internet was developed. Smart technologies could not be integrated into our lives. (before) 3. The lectures were over. The students went home. (every time) 4. Anna could come to her parents' house. She could come when she wanted. (whenever) 5. They had finished the work. They went out. (after) 6. He had tidied the room. His mother came home. (by the time) 7. We arrived home. Then they left. (just as) 8. Come in. Could you take off your shoes, please? (before)

STUDY NOTE. After time conjunctions in adverbial clauses of time we use **present tenses** to refer to **the future**: *When you finish (present instead of future) this task, you'll receive a bonus. I'll see him when I have time.*

BUT: *Do you know when they will come? (when they will come is a reported question).*

53. ***Which sentence is correct / incorrect in each pair? Explain why.***

1. When the term ends, we'll have the exams. When the term will end, we'll have the exams. 2. I'll feel more relaxed after I finish my project. I'll feel more relaxed after I'll finish my project. 3. When I finish writing the report, I help you with your homework. When I finish writing the report, I'll help you with your homework. 4. We won't finish the conference until we will answer all the questions. We won't finish the conference until we answer all the questions. 5. As soon as I am ready, I'll make you a cup of coffee. As soon as I will be ready, I'll make you a cup of coffee.

54. ***Fill the gaps with future time clauses. Role-play the dialogue.***

Reporter: Can you tell us about your latest invention, professor?

Professor: Not yet. It is not finished. Before I 1. (tell) anyone about it I 2. (make certain) it 3. (complete).

R: But everyone is anxious to know about it, professor. Can't you tell us anything?

P: I'm sorry, but I can't at this time. As soon as it 4. (be) ready, I 5. (tell) you all about it.

R: Can you at least tell us how much more work you have to do?

P: I just have to run a few tests. I 6. (hold) a press conference and answer all your questions after I7. (conduct) the tests.

R: How long will it take you to run the tests?

P: Not long. I 8. (run) the first tests as soon as I 9. (get back) to the lab. If all goes well, I should finish it in a week or two.

R: So you 10. (not give) us any information about your new invention until you 11. (finish) all the tests?

P: I'm sorry, but I just can't. However, I will say this much. You 12. (be) amazed when you 13. (learn) what my latest invention can do.

R: Is it true that you are going to retire soon, professor?

P: Yes. This invention will be my last. Once I 14. (introduce) it to the world, I 15. (retire) and spend more time with my wife and children.

CLAUSES OF REASON, PURPOSE AND RESULT

STUDY NOTE. Clauses of **reason** answer the question '**why**?', clauses of **purpose** answer the question 'for **what purpose**?' and clauses of **result** explain what the **outcome** of the action mentioned in the main clause is.

55. ***Choose the right word. Identify the types of clauses.***

A. 1. *With the aim of /Since* the basic job of computers is processing information, computers can be defined as devices which accept information and then provide the results. 2. People call our era the 'digital age' *because/ in order to* computers have become an essential part of our lives. 3. We really need to take care of the future of computers *owing to/ on the grounds that* they are going to have such a big impact our lives. 4. *As/ For* the operation of an integrated circuit depends on microscopic components, the purity of all materials and the cleanness at the plant they are produced at must be of the highest quality. 5. According to some researchers, many

space missions are more suited to telerobotic operation *due to/so that* lower cost and lower risk factors.

B. It's very important to get the most out of your time when you sit down with your books. Here's how: find a quiet place to study 1. *so that/as* you could concentrate and switch off your mobile phone 2. *so not /not to* be disturbed while you are working. Many students make a "to do" list before they study 3. *with the aim /with the view to* of reminding themselves how much they should spend on each topic. Another good idea is to give yourself a reward each time you achieve a goal 4. *in order to/in case* stay motivated. If you are studying with friends, agree that you will only talk about the subject you are studying 5. *so as not /not to* waste time. Finally, remember to take regular breaks. You need a short break every 30 minutes or so 6. *to prevent/to avoid* getting too tired.

56*. *Combine the two sentences into one with an appropriate linking word from the list.*

Example: *We are living in a constantly changing world. It is important to learn to adapt to change.* → *As we are living in a constantly changing world, it is important to learn to adapt to change.*

As, since, because, for, the reason why, on the grounds that, due to, owing to, so that, in order to, with the purpose of, with the view to, in case, etc.

1. New technologies are developing rapidly. Dexterous[1] robots might be with us very soon. 2. 3D printing is an advanced method of manufacturing parts. It may be possible to produce parts with high precision. 3. Even slight changes outside the procedure can cause a halt[2] of production line. Robots were introduced at the plant. 4. She went to the supermarket. She wanted to buy some milk. 5. I helped him. He finished early. 6. He bought an exercise bike. He wanted to get fit. 7. I left early. I wanted to be there on time. 8. We are gathered here. We need to reach a decision. 9. I will take some sandwiches. I might get hungry. 10. He opened an account. He wants to save money to buy a car. 11. Smart city is an area that collects different

types of electronic data. The aim is to analyse this information. 12. Machine learning models operate with minimal intervention[3] from humans. They greatly reduce the possibility of human error.

[1]dexterous ловкий

[2] halt остановка

[3]intervention вмешательство

CLAUSES OF CONTRAST AND CONCESSION

STUDY NOTE. We use clauses of **contrast** when we make two statements, and one statement makes the other seem surprising. They are introduced by the conjunctions **although, as, despite, in spite of, or though.**

57*. *Write a new sentence that combines the two parts using an appropriate conjunction of contrast or concession.*

Example: *I have been learning English for five years. I can't speak fluently.* → *Although I have been learning English for five years, I can't speak fluently.*

1. There are millions of different types of viruses. Only about 5,000 virus species have been described in detail. 2. Computer Assisted Learning is getting more popular. Some language teachers think that technology can become a distraction in the learning process. 3. She spent all the afternoon on the project. She did not finish it. 4. He has been living in Moscow for a long time. He does not speak Russian. 5. I used to love listening to her. I could only understand about half of what she said. 6. His company is profitable. He still needs to face up to some serious problems with price competition. 7. It was very late. Nobody wanted to leave. 8. It is summer. It is very cold. 9. Measures to slow it down were being taken. Covid -19 continued to spread exponentially. 10. He had a pain in his leg. He completed the marathon.

STUDY NOTE. When the adverbial clause comes before the main clause, it is usually separated from the main clause by a comma:

Though it was rainy, we put on our jackets and went for a walk.

BUT: *Everyone enjoyed the trip to the final although we lost the match!*

When we use conjunctions as **discourse markers**[1] we can use commas:

A: You have six hours in the airport between flights!

B: I don't mind, though. I have lots of work to do. I'll just bring my laptop with me.

[1]**Discourse markers** are special words that link, manage and help organise sentences.

58. ***Choose the correct option.***

1. Today there are a lot of different types of computers. *So/However* most computers, whether large or small, have basic capabilities. 2. *Despite/owing to* the fact that we are just at the start of the AI age, it is being used in lots of applications from simple games to fully autonomous cars. 3. *With the view to/Although* many approaches and technologies have been developed, it remains difficult to carry out machine learning with big data. 4. Data mining uses many machine learning methods *despite/while* machine learning also employs data mining methods. 5. *The reason why/Although* many vendors offer off-the-shelf solutions[1.] for big data, experts recommend the development of in-house solutions[2.] to solve the company's problems at hand. 6. Clever *whereas/as* he is, he failed the test. 7. *Even though/ Despite* having little money, he insisted on paying for the meal. 8. *In spite of/ Whatever* I say, she doesn't believe me. 9. I invited Sue. She didn't come, *although/though*. 10. Her mother is French *whereas/even though* his father is Polish. 11. Persuasive *though/but* you may be, I won't change my mind. 12. *Even though/Despite* we are good friends, we don't meet very often. 13. For a long time 3D printing has demanded very high entry costs, *however/as* recent market trends have found that this is finally changing. 14. *Although/Whatever* the term 'additive manufacturing' can be used synonymously with '3D printing', they have started using this term to encompass a wider variety of techniques.

[1]off-the-shelf solutions готовое решение

[2] in-house solution собственные решения

COMBINING NOUNS

59. ***Read the information in the box and translate or explain noun combinations***

below.

We frequently use two (or sometimes three or more) nouns together. The first noun usually tells us what kind of thing the second (or the last, if there are more than two nouns) noun describes: *a computer virus is a kind of virus*

1 data resource, storage resource, network resource, security resource, system resource.

2 communication facilities, data base facilities, display facilities, management facilities.

3 distance control, device control, keyboard control, position control, program control.

4 computer storage, laser storage, file storage, disk storage, data storage hierarchy.

5 character sequence, instruction sequence, message sequence, pulse sequence.

6 access file, catalogue file, data file, help file, image file, multimedia file, menu file, user file.

7 command input, data input, disk input, file input, keyboard input, program input.

CHECK YOURSELF

COMPUTERS IN FACTS AND FIGURES

60. ***How much do you know about the history of computers? Check yourself.***

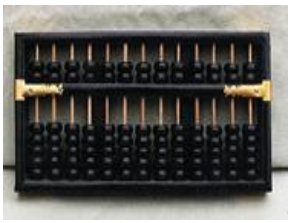
1. The first use of the word “computer” was recorded in 1613 referring to _____ .

a. a person b. a system of counting c. abacus

2. The earliest recorded calculating device is _____ .

a. the slide rule b. an astronomical clock c. abacus

3. The first mechanical calculator was designed in 1623 by _____ .



a. Charles Babbage b. Wilhelm Schickard c. Leonardo Da Vinci

4. Analytical engine, generally considered the first computer, was conceptualised and designed by a(n) _____ mathematician in the 1830s.

a. American b. British c. French

5. The first machine readable medium for control and data was _____.

a. paper tape b. electric signals c. punched cards

6. _____ is internationally recognised as the father of the modern digital computer.

a. Clifford Berry b. George Stibitz c. Howard Aiken

7. _____ developed the idea of modern computer science and artificial intelligence.

a. Claude Ramsay b. Charles Babbage c. Alan Turing

8. Since the 1950`s _____ generations of computers have evolved.

a. four b. five c. six

9. The first generation computers used _____ as a major piece of technology.

a. transistors b. integrated circuits c. vacuum tubes

10. The second generation of computers saw the use of transistors, which were widely used _____ .

a. from 1943 to 1956 b. from 1956 to 1963 c. from 1953 to 1965

11. The development of integrated circuit technology in the _____ further increased the speed and reliability of computers.

a. 1960s b. 1970s c. 1980s

12. The _____ brought the fourth generation of computers as thousands of integrated circuits were built onto a single chip.

a. microcontroller b. microprocessor c. microprogramming

13. The first personal computer was introduced by IBM in _____.

a. 1975 b. 1977 c. 1981

14. The World Wide Web was invented in _____ by computer scientist Tim Berners-Lee.

a. 1970 b. 1980 c. 1990

15. In ____Motorola engineer Martin Cooper made the world`s first public call from a mobile phone, choosing to get in touch with his rival in the race to create the device.

a. 1973 b. 1979 c. 1987

16. The first iPhone which combined a mobile phone, an iPod and a wireless communication device was launched in _____ by Apple.

a. 2002 b. 2007 c. 2009

14-16 *answers right: Congratulations! You are an expert in the history of computers.*

10-14 *answers right: you have a good knowledge of the history of computers.*

1-9 *answers right: you need to read more about the history of computers.*

61. ***Word Quiz. Choose the best word to fill in the gaps.***

1. A lot of tests were _____ to check how this method worked.

a. finished b. performed c. practised

2. The data is _____ on a hard disc and backed up on a flash card.

a. reserved b. deposited c. stored

3. The report contains _____ errors.

a. numerous b. entire c. appropriate

4. Programmers _____ and write software.

a. prepare b. code c. design

5. It is _____ that he has been offered the job of his dream.

a. amazing b. remarkable c. appropriate

6.The beginning of the summer was really warm but then the weather suddenly _____ cold.

a. transformed b. turned c. changed

7. One of the reasons we should _____ about politics is that it impacts nearly every aspect of our lives.

a. pay attention b. be fond c. care

8. At some stage we need _____ when the project will be finished.

a. to calculate b. to accept c. to compare

9. Before it is too late, we need _____ the seriousness of the problems we are facing.

a. to calculate b. to recognise c. to compare

10. Computer simulations might help _____ changes in climate with a surprising degree of accuracy.

a. predict b. expect c. suppose

11. To understand 'natural languages' computers must be equipped with artificial _____ .

a. intellect b. mind c. intelligence

12. They discussed how _____ the economic growth.

a. to assess b. to help c.to assist

13. Compared to the first computers, modern computers are really _____ .

a. tiny b. mini c. small-scale

14. On the basis of the size there are minicomputers, microcomputers, mainframes and _____ .

a. great computers b. large computers c. super computers.

15. Computer _____ are sent to a computer system and are processed by a software program rather than a person.

a. questions b. demands c. queries

16. The _____ of working from home is that you don't see your colleagues.

a. downsize b. downside c. downshift

17. Modern technologies provide lots of communications _____ .

a. abilities b. capacities c. capabilities

18. The article was _____ for publication last week.

a. accepted b. recognised c. processed

19. One of the important skills today is the ability to judge how _____ the information on the Internet is.

a. amazing b. reliable c. miraculous

20. There is a lot of public _____ about the downsides of vaccination.

a. concern b. query c. care

62*. ***Use an appropriate relative pronoun to link two clauses. Translate the sentences into Russian.***

Example: *A computer is a machine_____ performs operations according to instructions. → A computer is a machine* ***which/that*** *performs operations according to the instructions.*

1. A virus is a small infectious agent_____ replicates only inside the living cells of an organism. 2. Some scientists maintained the view that viruses were liquid in nature, later there were theorists _____proved that they were particulate. 3. Some viruses _____ are dependent on the presence of other virus species in the host cell are called satellites. 4. Internet television is a general term to refer to television _____ has a built-in operating system. 5. Smart television refers to the TV set _____ enables the delivery of video content over the Internet.

63. ***Fill the gaps with who, which, whose, that, where or when. Then choose the correct answer.***

1. Name the scientist _____ discovered general theory of relativity.

a. Albert Einstein b. Stephen William Hawking

2. Name the story _____ inspired Sir Isaac Newton to formulate his theory of gravitation.

a. an apple incident b. the meeting of Peter I and Sir Isaac Newton

3. Name the year _____ Avatar was released.

a. 2009 b. 2018

4. Name the country _____ the film the Lord of the Rings was filmed.

a. Australia b. New Zealand

5. Name the philosopher and writer famous for his advocacy of freedom of speech and religion, _____ name was …

a. Pierre Curie b. Voltaire

6. Name the film _____tells the story of a robot that collects rubbish.

a. Wall-E b. Interstellar

7. Name the book _____ is regarded as a central work of world literature.

a. War and Peace b. Invisible Man

8. Name the place of interest _____ is the most recognisable structure in Moscow.

a. GUM b. the Kremlin

9. Name the painter _____ is considered the greatest master of marine art.

a. Serov b. Aivazovsky

10. Name the city _____ Pushkin was born.

a. Moscow b. St. Petersburg

64*. *Complete the second sentence so that it has a similar meaning to the first sentence, using the word given.*

Example: *This textbook is one of the best self-study resources.*

(which) This is the textbook _____ is one of the best self-study resources. → This is the textbook which is one of the best self-study resources.

1. Although the weather was wet, they still enjoyed their holiday. (despite)

They enjoyed _____ weather.

2. Although her arm was broken, she managed to get out of the car. (fact)

In spite _____arm was broken, she managed to get out of the car.

3. He used to work in that institute many years ago. (where)

That's the institute _____ many years ago.

4. We only admit the children who have a parent or a guardian with them. (whose)

We only admit the children _____with them.

5. After the discussion with their parents they decided to change the school. (when)

_____ with their parents they decided to change the school.

65. *Complete the sentences with one word. Choose from the list of words below.*

Such /so…that, consequently, as a result, thus, therefore, so

1. There were _____ many people at the party _____ I did not have time to talk to everyone. 2. It was ____ a bad night _____ we'll never forget it. 3. It is _____ noisy _____ I can't work. 4. It was _____ nice weather _____ we went to the park. 5. I had forgotten my passport and _____ I couldn't go through passport control at the airport. 6. He did not work hard. _____ he lost his job. 7. He had been ill for a long time. _____ he looked older than he really was. 8. The population is growing. _____ we need more food. 9. The town stood at the foot of the volcano. _____, every building was destroyed. 10. The lecture was _____boring and irrelevant _____ some of the students began to fall asleep.

66. ***Underline the correct linking words.***

1. You can use my phone *as long as/apart from* you return it as soon as possible. 2. I'm saving up *in order to/ in case* buy a house. 3. I am late *because/in short* I forgot my papers and I had to come back home to get them. 4. Peter and Mary couldn't agree on a film, *so/for example* they went for a walk. 5. *Although/All in all* her grandmother didn't like her present, she pretended she did *so as not/ because not* to hurt her granddaughter' feelings. 6. The whole class wanted to see a video *whereas/apart from* Alexander who wanted to read the article. 7. *With respect to/In order to* my colleague's idea, I'd like to offer my support. 8. No man ever became great or good *except/apart* through many and great mistakes. 9. The sisters decided to live in the city *because/whereas* their brother stayed in the country house. 10. The presenter completed his speech and *afterwards/until* he asked if anyone had any questions.

67. ***Answer the following questions. Consult Module 5 texts.***

1. What is a computer? 2. What do you remember about the invention of computers? 3. What generation of computers are we using today? 4. What types of computers are there? 5. Do computers make our life easier? 6. What are the most popular smart devices today? 7. What is Alexa and how can it be used? 8. What are artificial

intelligence (AI) and machine learning (ML) technologies? 9. What are the advantages and disadvantages of using AI? 10. What is the future of AI?

MODULE 5 PROGRESS TEST

Vocabulary. ***Decide which answer a, b or c best fits into each gap.***

What are computers?

Computers are machines that __1__ tasks or calculations __2__ to a set of instructions, or programs. The first fully electronic computers, introduced in the 1940s, were huge machines that __3__ teams of people to operate. __4__ those early machines, today's computers are amazing. Not only are they thousands of times faster, but also they can fit on your desk, in your lap, or even in your pocket.

Computers work through an interaction of hardware and software. __5__ refers to the parts of a computer that you can see and touch, including the case and everything inside it. The most important piece of hardware is a tiny rectangular __6__ inside your computer called the central processing unit (CPU), or __7__. It is the "brain" of your computer—the part that translates instructions and performs ___8 ___. Hardware items, such as your monitor, keyboard, mouse, printer, and other items are often called hardware devices.

__9__ refers to the instructions, or programs, that tell the hardware what to do. A word processing program that you can use to write letters on your computer is a type of software. The operating system (OS) is the software that manages your computer and the __10__ connected to it. Two well-known operating systems are Microsoft Windows and Apple Mac OS X.

1	a. present	b. produce	c. perform
2	a. according	b. in accordance	c.in agreement
3	a. requested	b. required	c. demanded
4	a. along with	b. except for	c. compared to
5	a. software	b. malware	c. hardware
6	a. chip	b. cube	c. plate
7	a. microcontroller	b. microcircuit	c. microprocessor

8 a. estimations b. calculations c. sums

9 a. software b. freeware c. shareware

10 a. units b. applications c. devices

Grammar. ***Decide which answer a, b or c best fits into each gap.***

1. My neighbour, _____ I helped to install the application, always forgets his password.

a. to which b. whose c. whom

2. Dayton is the town _____ the Wright brothers were born in.

a. where b. which c. in which

3. We continue to drive cars _____ we know how dangerous they might be in many respects.

a. because b. though c. so

4. Metro in Moscow was designed _____ the commuters could travel very quickly around the city.

a. in order to b. although c. so that

5. I was nervous _____ I had never been on the stage before,

a. although b. because c. thus

6. The plane is fast and comfortable. _____ the tickets are too expensive.

a. However, b. Despite c. As

7. We use flash memory _____ save information quickly and easily in such devices as digital cameras and home video game consoles.

a. because b. in order to c. which

8. She didn't do her best during the semester and _____ she failed the exam.

a. therefore, b. since c. so that

9. I will walk to work when the days _____ longer.

a. will get b. get c. will be getting

10. I like chocolate _____ is unhealthy.

a. which b. , that c. , which

MODULE 6

SPACE TECHNOLOGIES

"Earth is the cradle of humanity, but one cannot remain in the cradle forever." - *Konstantin Tsiolkovsky, a Russian rocket scientist.*

Learning points for Module 6:

Reading:

Text A. Why We Explore Space

Text B. Extraterrestrial Life Probably Exists

Text C. Top Space Exploration Accomplishments

Vocabulary in context: Collocations/Word forms/Synonyms/Dictionary skills/Word quiz

Grammar: Modal verbs/ Semi-modal verbs/ Phrasal modals

Speaking: Key Events in the History of Space Exploration

Listening: From the History of Space Research

Skills: Making Notes

Learning aims:

- to practise reading and speaking about space technologies;
- to learn and practise active vocabulary related to the topic of the module;
- to learn and practise modal verbs;
- to learn and practise the skill of note-making.

Lead-in

Discuss the following questions in mini groups and share your ideas with others.

1. How important is space exploration? 2. Can you think of any inventions or benefits which have resulted from space exploration? What are they?

READING

Part 1

1. ***Skim text 6A and identify its main points choosing from the list below. Confirm your answers with the quotes from the text.***

1. Space exploration has provided enormous benefits to our society.
2. The money invested into space exploration could be better spent on more worthy areas.
3. Without space research progress in technology would stop.
4. Space missions cannot help eliminate poverty and hunger on the Earth.
5. Research conducted on board the ISS creates a lot of opportunities to address crucial issues facing mankind.
6. A global network of satellites could enable internet connectivity to most people.
7. Applications of space technologies on Earth are numerous and important.

Text 6A

WHY WE EXPLORE SPACE

(1) Our interest in the heavens has been universal and enduring[1]. The desire to explore the unknown, discover new worlds, push the boundaries[2] of what we know and where we have been and then push further has provided benefits to our society

for centuries. Space exploration helps answer fundamental questions about our place in the universe and the history of our solar system. Through addressing the challenges related to space exploration we expand the demand for new technology, create new industries, and promote cooperation between nations.

(2) The progress that is made while solving the technical challenges of space exploration is a catalyst for the chain reaction of innovation. While space missions do not directly address poverty and hunger on Earth, they create many spin-offs[3] that might do so, providing a significant return on investment in these efforts. In addition to the need for mankind's technological advancement, these developments are required if we want to continue to improve human life conditions on our ever-crowding[4] Earth.

(3) Each year hundreds of technical innovations generated by space programmes make their way into our earthly technology such as: better home appliances, advancements in farming equipment, faster communications, more precise maritime[5] and aerospace technologies, safety through early warning of extreme weather, improved medical instruments, and other innovations.

(4) The International Space Station, a cooperative working and research environment, allows for experiments to take place in never before possible conditions. Experiments with health and medical technologies on board the ISS, as well as astrobiological experiments, have the potential of dealing with diseases[6] on Earth. Connectivity on Earth is greatly enhanced[7] by using satellite-based communications accessible even through our everyday mobile phone. Terrestrial[8] autonomous vehicles will be coordinated on Earth through growing satellite infrastructure. Earth observation of weather and climate change related issues are now collected by space satellites.

(5) These are just a few of many examples of how spaceflight research is positively impacting the life on Earth. Some may consider space programmes towards the moon, the sun, the planets, and the stars to be a distraction away from our Earth, but it is becoming clear that those programs help us discover more about the planet that we are living on. The sky is no longer the limit of our knowledge and opportunity.

Vocabulary notes for Text 6A

[1]enduring	продолжительный
[2]push boundaries	раздвигать границы
[3]spin-offs	побочные продукты
[4]ever-crowding	с растущим населением
[5]maritime	морской
[6]diseases	болезни
[7]enhanced	увеличена
[8]terrestrial	земной

2. ***Find the words in the text that correspond to the following meanings.***

§1

1 in the sky
2 to do things that no one has been able to do before
3 to make available something good
4 dealing with difficult tasks
5 to develop or increase something

§2

6 a specific task to explore space
7 to deal with poverty and hunger
8 the benefit an investor may receive
9 the development and growth of technology
10 an existing situation

§3

11 a new idea or method
12 devices or machines for home use

§4

13 created in cooperation, together with other countries
14 communications through devices launched into orbit
15 easy to use

16 means of transport which are able to move on their own without a driver §5

17 to think about something, have an opinion

18 something that prevents someone from giving their attention to something else

3. ***Read the text again and answer the following questions.***

1. What is the main idea of the first paragraph? 2. In what way are innovations and technological progress on our planet connected with space exploration? 3. What arguments does the author give to prove the point that space exploration is also beneficial for life on Earth? 4. What examples of using space technologies in everyday life does the author give? 5. What conclusion does the author come to? 6. Did you find the text interesting? 7. Was there any information that surprised you? 8. Do you agree with the author's conclusion? Why?

4. ***In pairs complete the sentences without looking into the text.***

1. Space exploration helps _____. 2. If we want to continue to improve human life conditions on our ever-crowding Earth we need _____. 3. The International Space Station allows _____. 4. Hundreds of technical innovations generated by space programmes _____. 5. Some may consider space missions to be a distraction away from Earth, but _____.

5. ***Reread text 6A and make notes on its main points. Then summarise this text using your notes.***

6. ***Discussion. Students A strongly believe that space exploration is essential for technological progress and it is changing our life for the better; Students B strongly believe that space exploration is very expensive and that the money spent on it should be spent to help solve more important problems on Earth. Change your partner and argue your point.***

READING

Part 2

7. ***In pairs / groups discuss these words from text 6B. Explain their meaning or translate them into Russian. Use a dictionary if necessary.***

Search /extraterrestrial /evolution /alien /intelligence /astronomer /telescope / project /laser /signature /chemical /universe /compelling /fiction/mainstream

8. ***In groups discuss the following questions and share your ideas with others.***

Is there life on other planets? How do we search for alien life? Do we need to look for aliens? Why? Why not?

9. ***Now read the text and compare your ideas with the ideas in the article.***

Text 6B

EXTRATERRESTRIAL LIFE PROBABLY EXISTS

(1) Is there life on other planets? Are we alone? These are two of the biggest questions humans have been asking for centuries. Scientists have recently launched a major search to find out if there is... anybody out there. They are the researchers from the SETI Institute. (SETI stands for Search for Extraterrestrial Intelligence.) The mission of SETI is to explore, understand and explain the origin and nature of life in the universe and the evolution of intelligence. SETI scientists are using new technologies to scan the heavens for signs of alien life. They intend to share their data with the public. SETI hopes that by sharing data, "citizen scientists" could spot things missed by scientists.

(2) SETI's astronomers are using twenty-eight giant radio telescopes in their search for alien life. The telescopes are located all around the world which enable them to search the entire sky. The signs they are looking for are called "techno-signatures". These include things like alien chemicals, large amounts of oxygen, non-natural structures, and light from lasers. Astronomers say that determining whether we are

alone in the universe is among the most compelling questions in science and that we are getting closer to finding out if alien life exists. According to their opinion, this science is no longer fiction, but is almost mainstream.

10. ***Read the text again and match the words with their definitions using the context.***

§1 1.alone 2.centuries 3.launched 4.mission 5.origin 6.evolution 7.citizen	 a. the point where something begins b. someone who is from a certain country c. having no one else present; on one's own d. periods of one hundred years e. an important task or assignment f. the process by which different kinds of living things are thought to have developed and changed g. started a new project or activity
§ 2 8. mainstream 9. telescope 10. entire 11. signatures 12. structure 13. capable 14. astronomer	 h. having the ability to do or achieve a specified thing i. a building or other object constructed from different parts j. a special product, or characteristic that can easily identify something or someone k. someone who studies space and the universe l. ideas or opinions that are thought of by most people as being normal m. something we look through to make faraway objects look nearer, especially things in space n. with no part left out; whole

11. ***Read the text and answer the questions.***

1. How do you understand the question asked in the article: 'Are we alone?' 2. How long have we been asking questions about aliens? 3. What does 'SETI' stand for? 4. What are SETI scientists using to scan the heavens for signs of alien life? 5. Who might spot things missed by scientists? 6. What 'signs' are the telescopes looking for? 7. What do you think SETI scientists might find? 8. Did you enjoy reading this article? Why? Why not?

12. ***In turns summarise text 6B. Use key words from Exercises 7 and 10 as prompts.***

READING

Part 3

13. ***You are going to read about the key moments in space exploration. In groups match the important events in the history of space exploration with the following dates.***

1. October 4, 1957	a. first-ever spacewalk
2. April 12, 1961	b. the first man in space
3. 18 March 1965	c. first space tourist
4. July 16, 1969	d. assembly of ISS begins
5. November 20, 1998	e. first man on the Moon
6. April 28, 2001	f. the world's first artificial satellite

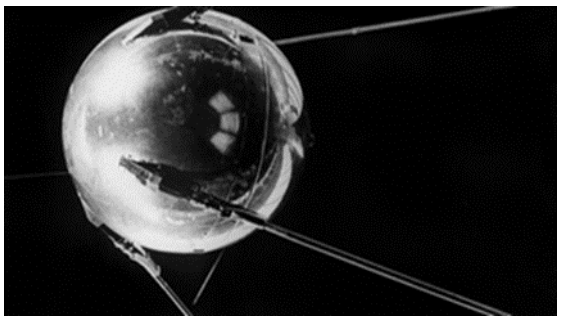
14. ***Now scan Text 6C and check your answers.***

Text 6C

TOP SPACE EXPLORATION ACCOMPLISHMENTS

Sputnik 1

"Listen now," said the presenter of American radio station NBC, "for the sound which forever more separates the old from the new." He was referring to the "beep beep beep" transmitted from Sputnik - satellite launched on October 4, 1957, by the USSR; the sound heralded[1] the space race.



In fact, the race had already begun. Since the mid-1950s, both the USSR and the US had signalled their intentions to launch artificial satellites as a part of International Geographical Year (IGY), which spanned July 1957 to December 1958. The Soviet launch was timed for maximum political impact; Sputnik first orbited the Earth as scientists from the superpowers were meeting at an IGY reception at the Soviet Embassy in Washington. This led Dr Joseph Kaplan, Chairman of the American IGY committee, to congratulate his Russian rivals on remarkable achievement. The launch was more than remarkable. At 83.5 kilograms, sputnik dwarfed[2] the Americans` satellite-in-waiting, Explorer 1, which would not reach orbit until February of the next year.

Yuri Gagarin Is The First Human Sent Into Orbit

The Soviet cosmonaut Yuri Gagarin became the first human in space and the first to orbit the Earth, in the USSR`s highly successful mission, Vostok 1, on April 12, 1961.Taking off from the Baikonur Cosmodrome in Kazakhstan at 9:07 am, Gagarin was launched into space and completed one full orbit of the Earth before returning back to the Earth by 11:05 am. After his historic feat was announced, Y. Gagarin became an instant worldwide celebrity. The triumph of the Soviet space programme in putting the first man into space was something of a blow for the United States in the ongoing space race. Though they followed right behind by sending their man up a few weeks later, at this point the Soviets already had the upper hand.

Leonov Walks In Space

Alexei Leonov was selected to become one of the Soviet Union`s first group of cosmonauts in 1959, along with Yuri Gagarin. After Gagarin`s historic first space flight in 1961, the USSR began flying more and more technically complex flights. Voshod 2 was supposed to be no exception. It was the Soviet`s eighth manned flight. On the 18th of March 1965 Leonov attempted to leave the capsule on a tether [3] and float in space, just in his space suit, while his fellow cosmonaut Pavel Belyaev

remained inside. Ten minutes into his space walk, Leonov encountered a problem. His space suit had ballooned and stiffened in the vacuum of outer space, and he was unable to fit back inside the airlock[4]. There was no contingency[5] plan for rescue so if Leonov had not been able to overcome this problem, his fellow cosmonaut would have had to cut him loose and return without him. Leonov decided to make a risky move. He partially deflated[6] his space suit by allowing air to bleed[7] into space, and he was eventually able to squeeze himself back inside the capsule safely.

Man On The Moon

The purpose of the mission was simple: perform a manned lunar landing and return. The Apollo lunar landing program began in the 1950s as a NASA initiative, but it wasn`t until the 1960s when it really took off, literally and figuratively. The Apollo 11 mission occurred eight years later. Seventy-six hours after launching on July 16, 1969, the spacecraft reached lunar orbit. Commander Neil Armstrong and a lunar module pilot Buzz Aldrin formed the crew of the lunar module "Eagle" that landed on the Sea of Tranquility. Taking his first step on the Moon at 10:56 pm EDT, Armstrong famously declared to a television audience of approximately 700 million people: "That`s one small step for man, one giant leap[8] for mankind". Armstrong was followed by Aldrin, and they both spent about two-and-a-half hours on the Moon, collecting samples, taking photos, planting flags, and performing scientific experiments.

International Space Station Takes Shape In Orbit

Easily visible to the naked eye, the International Space Station is the largest man-made structure ever assembled in space. The research facility weighs over 230 tons, and orbits around 290 kilometers above our heads at over 27,360 kilometers per hour. The International Space Station is a symbol of humanity's prowess and potential for space travel. In the 1980s and 1990s, *Mir*, a major space station built by the Soviet Union, played that role. *Mir* outlasted the USSR, eventually orbiting the Earth for 15 years and hosting crew members from across Europe, the United

States, and Canada. The process of assembling the ISS began on November 20, 1998, when Russian module *Zarya* was launched from the Baikonur Cosmodrome in Kazakhstan. Just two weeks later, the USA launched the second piece, a connecting node[9] known as Unity. A Russian life support module followed, allowing habitation from November 2000. Since then the ISS has been permanently manned and has grown considerably in size. As well as sections from two space superpowers, it also includes laboratories from Europe and Japan and a construction boom[10] from Canada. It is both the most sophisticated platform for space sciences ever built and a testing ground for international space collaboration. Among other things the laboratories use microgravity conditions to look for new drugs and investigate effects of weightlessness on the human body.

First Tourist In Space

Hands up those who wanted to be an astronaut when they were young. Well, Dennis Tito did and, forty years after Yuri Gagarin became the first man in space, his wish came true. Tito had always had a strong interest in space exploration. His early career involved working in a jet propulsion lab and tracking NASA`s Mars probes[11]. He was in love with space. But he loved money more and ended up running his own investment firm. By the age of sixty, his immense personal fortune would give him the opportunity of a lifetime. He could afford paying the US$20 million price of the return ticket to space. Tito spent under eight days in space; six days were spent on board the International Space Station and in that time he orbited the Earth 128 times. Apparently he doesn`t like the term “tourist” and would rather be called an “independent researcher”.

Vocabulary notes for text 6C

[1]heralded	возвестил
[2]dwarfed	заставил казаться маленьким
[3]tether	трос
[4]airlock	переходный шлюз
[5]contingency	непредвиденное обстоятельство

[6]deflate спускать

[7]to bleed спускать лишнее давление

[8]leap скачок

[9]node узел

[10]boom кран

[11]probe зонд, автоматическая станция

15. ***Read text 6C and circle any words you do not understand. In groups, write them down and look them up in the dictionaries.***

16. ***Read text 6C in detail and decide if the statements below are `T`(True), `F`(False) or 'NG' (Not Given). Say why the false answers are not true.***

1. The space race between the USSR and the US began after Sputnik 1 was launched by the USSR. 2. The launch of the first satellite was of a great political significance for the USSR. 3. The flight of the first human into space was the result of close cooperation of space superpowers. 4. Gagarin`s flight was only a temporary defeat of the US in the space race. 5. In the 1960s the space race meant that each new space flight had to be longer than the previous one. 6. If Leonov hadn`t overcome the problem with his space suit his partner would have returned home without him. 7. The purpose of the first moon mission was to win the space race. 8. The Apollo lunar landing program was not successful. 9. The ISS is designed for the development of space tourism. 10. The first space tourist paid a huge sum of money for his travel but that was the opportunity of a lifetime for him.

17. ***Answer the questions.***

1. What sound did the presenter of NBC refer to saying that "it separates the old from the new"? What did he mean by that? 2. Why can we say that the launch of Sputnik 1 was timed for maximum political impact? 3. Who became the first man in space? When? 4. In what way Voshod 2 was supposed to be more elaborate and technically complex than the previous flights? 5. What problem did Leonov encounter during his mission in outer space and how did he deal with it? 6. Can

you explain the famous words of Neil Armstrong: “That`s one small step for man, one giant leap for mankind.” When and where did he say these words? 7. What is the largest man-made structure in space? 8. What practical applications does the construction of the ISS have? 9. What does the word “space tourism” mean? 10. Who was the first space tourist? Where did he travel to?

Listening

18. ***Listen to two episodes from the history of space research. Write down some extra facts and useful words to talk about space exploration.***

https://www.youtube.com/watch?v=GhAXlR68tL8

https://www.youtube.com/watch?v=XHcJIQzmQKQ

19. ***Prepare to talk about one of the key events in space exploration described in Text 6C or from the listening above. Be ready to answer some questions from your group.***

VOCABULARY

Module 6 Word List

Essential Vocabulary	Additional Vocabulary
1. accessible (adj)	1. alien (n, adj)
2. accomplish (v)	2. announce (v)
3. address (v) problems (n)	3. assemble (v)
4. autonomous (adj) vehicle (n)	4. attempt (n)
5. condition (n)	5. be underway (adj)
6. connectivity (n)	6. collaboration (n)
7. deal with (v)	7. compelling (adj)
8. distract (v) / distraction (n)	8. completion (n)
9. earth (n)	9. condition (n)
10. effort (n)	10. crew (n)
11. enhance (v)	11. deliver (v)
12. expand (v)	12. determine (v)

13. exploration (n) 14. explore (v) space (n) 15. in addition 16. innovation (n) 17. investigate (v) 18. launch (v) (rocket) 19. mankind (n) 20. mission (n) 21. overcome (v) 22. promote cooperation (n) 23. push (n) boundaries (n) 24. relate (v) 25. significant (adj) 26. spacecraft (n) (pl. spacecraft) 27. search (v, n) 28. universe (n)	13. establish (v) 14. facility (n) 15. find out (v) 16. investment (n) 17. mainstream (adj) 18. maintain (v) 19. manned (adj) 20. permanently (adv) 21. purpose (n) 22. refer (v) to something 23. remarkable (adj) 24. sample (n) 25. sign (n) 26. stand (v) for 27. stay (v) on board 28. survey (n) 29. testing ground (n) 30. weigh (v) /weight (n)

20. ***Look at the words below. With your partner, try to recall how they were used in text A.***

Boundaries / benefits / challenges / mission / advancement / conditions / cooperative / accessible / survey / consider / vehicles / access.

21. ***Match the words in columns A and B to make up word combinations. Write your own sentences with these phrases.***

Example: *to complete a mission: Once you <u>complete a mission</u>, you become another character to play a different role.*

I.	**A**	**B**	**II.**	**A**	**B**
1.	to address	a. advancement	1.	to launch	a. question
2.	return	b. vehicles	2.	to complete	b. samples

3. technological	c. boundaries	3. to collect	c. ground
4. to provide	d. challenges	4. to be called into	d. a capsule
5. to push	e. to space	5. to investigate	e. condition
6. to expand	f. communication	6. microgravity	f. the effects on
7. autonomous	g. on investment	7. the research	g. mission
8. satellite	h. benefits	8. to promote	h. facility
9. to impact	i. the demand	9. to stay (to be)	i. cooperation
10. access	j. our life	10. testing	j. on board

22. ***Read the sentences below and underline the key words and expressions from the previous exercise. Translate the sentences into Russian***.

I.

1. Technological advancement is the source of economic growth in the long run. 2. He believes 3D displays will push the boundaries of video games, enabling the most immersive experience possible. 3. Geographical boundaries are not important for satellite communication. 4. Lots of scientists are trying to analyse how global warming is impacting our life. 5. People from all over the world make a lot of efforts to address the environmental challenges. 6. During the debate they argued about the benefits for people provided by the vaccination. 7. According to statistics, the demand for new technology is expanding rapidly. 8. Autonomous vehicles are widely employed in space exploration. 9. Energy efficiency is important as it increases the return on investment. 10. Our students have access to the library resources of the university.

II.

11. The space center prepared to launch the rocket far into outer space. 12. The company is planning to open a new research facility that will create more opportunities for space exploration. It will also serve as a testing ground for new experiments. 13. This study investigated some common side effects of new vaccines. 14. When all passengers were on board, the train pulled out of the station. 15. More and more artificial satellites are launched into space nowadays to help us communicate. 16. The delegation completed its mission successfully. 17. It is such

a serious error that it calls the rest of the results into question. 18. The local charity is trying to collect money to buy Christmas gifts for children in need. 19. Microgravity is the condition in which people or objects appear to be weightless. 20. The accident has left him permanently disabled.

23. ***Match the synonyms.*** (The words in **bold** are from text 6B)

1. alone	a. information	**6. search**	f. powerful
2. launched	b. aim	**7. entire**	g. is living
3. stand(s) for	c. by yourself	**8. compelling**	h. common
4. mission	d. started	**9. exist(s)**	i. whole
5. data	e. means	**10. mainstream**	j. hunt

24. ***Rewrite each sentence replacing the underlined words by the word from the box so that the new sentence will have the same meaning as the first one.***

Example: *The epidemic has considerably <u>influenced</u> the country's economy.* → *The epidemic has considerably <u>impacted</u> the country's economy.*

Alone / launch / stand for / mission / data / have existed / search / entire / compelling / mainstream

1. We've been <u>living</u> under the same roof for a long time. 2. His <u>aim in life</u> was to find new sources of energy. 3. I wish the <u>whole</u> world was like that! 4. Video games have become much more <u>common</u> since the introduction of a mobile phone. 5. The police are on the <u>hunt</u> for further clues. 6. What does IBM <u>mean</u>? 7. They managed to <u>start</u> a new business in a difficult situation. 8. <u>Information</u> is transmitted via a modem link to the central office. 9. His speech was a <u>powerful</u> call for action. 10. I knew that I won't be able to do the whole job <u>by myself.</u>

25. ***Complete each sentence with the correct form of the word in capitals.***

Example: *While planning _____ missions we need to _____ the risks of the effects of space-flight conditions on our immune system.* MAN, ASSESSMENT →

While planning manned missions we need to assess the risks of the effects of space-flight conditions on our immune system.

1. We need to carry out a full _____ of all the new sources of energy. EXPLORE 2. Cyber criminals try to gain _____ to your financial details. ACCESSIBLE 3. He said that he could turn the television off if I find it a _____. DISTRACT 4. There were no any _____ to specific situations in her speech. REFER 5. If you want to learn to be good at arguing you need to be able to think of _____ arguments and examples. COMPEL 6. The speaker announced the nearing _____ of the project. COMPLETE 7. Old houses need a lot of _____. MAINTAIN 8. We need to _____ effective communication between all the parties. ESTABLISHMENT 9. After a week of dieting there was only a slight decrease in his _____. WEIGH 10. Smoking is damaging your health _____. PERMANENT

26. ***Work in groups. Prepare 10-15 examples with the words from vocabulary section. Write them down on separate cards using gaps instead of the key words. Exchange your cards with other groups and do the gap filling. Check your answers.***

27. ***Summarise in English using some key words from the vocabulary section.***

Орбитальные станции - один из ранних проектов, предложенных К. Циолковским еще в 1903. Основной целью их разработки было создание платформы для космических полётов, что дало бы возможность запускать космические корабли с орбиты. Известно, что и в наше время колонизация человеком планет и их спутников наталкивается на ряд существенных трудностей, связанных с гравитацией, температурным режимом и отсутствием магнитосферы, поэтому идея создания поселений в космосе, используя материал астероидов, спутников, планет получила преимущество перед идеей колонизацией планет. Гипотетическая колонизация Марса всегда вызывала интерес со стороны государственных космических агентств и частных корпораций. Первыми на поверхность Марса вышли два советских зонда:

спускаемые аппараты "Марс-2" и "Марс-3". Хотя оба зонда достигли поверхности Марса, ни один из них не сработал успешно. С тех пор на Марс были отправлены десятки космических аппаратов без экипажа для изучения поверхности планеты, климата и геологии. Каждая миссия добилась прогресса. Сегодня у ученых есть целый парк роботизированных космических аппаратов, изучающих Марс со всех сторон.

SPEAKING AND DISCUSSION

28. ***Discuss the following questions in groups.***

1. What other important achievements in space exploration would you add to the list of the “key moments” from Text 6C?
2. Search the Internet and prepare to talk about an important key moment in space exploration which you think should be included into the list. (https://www.britannica.com/science/space-exploration)
3. Would you like to travel into space? Why/Why not?
4. Do you like films about space? Why/Why not?
5. Do you think more people will travel into space in the future? Why/Why not?
6. Do you think space travel will ever become affordable for all people?
7. Do you think that developing space tourism as an industry is a good or a bad thing?
8. Rank these things below with your partner. Put the most interesting things about space from the list at the top. Share your rankings with others.

- Aliens
- Colonising Mars
- Black Holes
- Comets
- The Moon
- The Aurora Borealis
- Space dust
- Zero gravity

29. ***Choose one of the points above and prepare a mini presentation about it.***

30. ***Use the cards below to prepare for a role-play exercise. In your group decide which mission is the most important/least important after the debate.***

Role A – Aliens

You think that search for aliens is the most important mission in space exploration. Give three reasons why. Tell the others why you do not agree that their ideas are more interesting than yours. Also, say which mission of these (exploring black holes, zero gravity or colonising Mars) is the least important.

Role B – Black Holes

You think that exploring black holes is the most important mission in space exploration. Give three reasons why. Tell the others why you do not agree that their ideas are more interesting than yours. Also, say which mission of these (search for aliens, exploring zero gravity or colonising Mars) is the least important.

Role C – Zero Gravity

You think that exploring zero gravity condition is the most important mission in space exploration. Give three reasons why. Tell the others why you do not agree that their ideas are more interesting than yours. Also, say which mission of these (search for aliens, exploring black holes or colonising Mars) is the least important.

Role D – Colonising Mars

You think that colonising Mars is the most important mission in space exploration. Give three reasons why. Tell the others why you do not agree that their ideas are more interesting than yours. Also, say which mission of these (search for aliens, exploring zero gravity or black holes) is the least important.

GRAMMAR

Lead-in

Read the sentences below and discuss the following questions.

1. What are the highlighted verbs called? What are they used for?
2. What kind of infinitives are used after them?
3. What is special about the third person (he, she, it) of these verbs?
4. What is special about the questions and negative forms?

1. We can now ask the digital device Alexa for advice if we are worried about our health. 2. Alexa will be able to search the NHS website for information and find the answer that is agreed on by many health experts. 3. Some people think that we shouldn't trust the advice of a piece of software. 4. They say we must go to a human doctor if we have serious health problems. 5. Can Artificial Intelligence replace the humans? 6. Some may consider space programs towards the moon, the sun, the planets, and the stars to be a distraction from our Earth. 7. Scientists have revealed that air pollution might be responsible for a significant reduction in intelligence. 8. We could significantly cut our carbon footprint if we stopped sending unnecessary 'thank you' emails. 9. The experts agreed that the growth of digital technology would require more electricity. 10. After studying this topic very thoroughly, the class ought to achieve good results in the test.

STUDY NOTE. Modal auxiliary verbs are also called modals. They are normally followed by a main verb. We use modals to **make an assessment, judgement or interpretation** of what we are speaking or writing about, or to express our **attitude** to this. *I can play tennis. (ability); You should see a doctor. (advice); It must be cold outside. (assumption); etc.*

MODAL VERBS

can	**may**	**will**	**shall**	**must**	
could	**might**	**would**	**should**	**ought to**[1]	

· are not inflected in the third person: *He must go*. not ~~*He musts go*~~

· are followed by the bare infinitive (except for ought to): *I must go*. not ~~*I must to go*~~

· are negated by adding not: *I cannot (can't) go.* not ~~*I don't can go*~~

· are inverted with the subject to form a question: *Can you answer a few questions?*

· have no infinitives or participles.

[1] *some grammarians call 'ought to' a semi-modal verb.*

31. ***Use the infinitives below to complete the sentences. Translate the sentences.***

(to) answer, (to) speak, (to) go, (to) clean up, (to) graduate from, (to) speak, (to) be, (to) rain

1. Can you _____ any foreign languages? 2. When will you _____ university? 3. Must you _____ so loudly! 4. Could you _____ a few questions? 5. They may_____ to St. Petersburg soon. 6. My keys must _____ in the car. 7. It may _____ tomorrow. 8. You ought _____ your room.

32. ***Change the sentences into questions using the pronouns given in the brackets. Example:*** *I can speak French. (you) - Can you speak French?*

1. He can cook. (she) 2. She can use your phone. (I) 3. I must leave soon. (you) 4. They will answer your questions. (he) 5. I shall go by car. (we) 6. I would like to help. (you) 7. Medicine ought to be free. (it) 8. You should call the police. (I)

33. ***Read the sentences and explain the meaning of modal verbs or translate them into Russian. Use a dictionary if necessary. Put the sentences into negative and interrogative forms where possible. You can choose from the following list: possibility, obligation, ability, permission, advice, proposal, necessity, past ability, strong obligation, certainty, polite request.***

Example: *I can swim. Meaning –Ability. I have learned to swim and I am able to swim. Can you swim? No, I cannot (can't) swim.*

1. I can play the piano. 2. You can borrow my dictionary. 3. My friend could ride a bike when he was little. 4. You may ask questions after the meeting. 5. It may rain tonight. 6. You must clean the windows. They are very dirty. 7. What time is it? It must be very late! 8. It is a fantastic film. You must see it. 9. You look tired. You should go to bed earlier. 10. I will carry a bag for you. 11. I would like to ask a few questions. 12. Shall we go to the cinema tonight? 13. They ought to have more parks in the city centre. 14. Everyone ought to do more exercise.

34. *Rewrite these sentences in a different way using the modal given.*

Example: *Let me answer this question. (may)* → ***May*** *I answer this question?*

1. Your suitcase is very heavy. Let me help you. (can) 2. You worry too much. My advice is 'take it easy'. (should) 3. It's not a good idea to eat late at night. (should) 4. I insist you apologise. (must) 5. Why don't we stay at home tonight? (shall) 6. Is it all right if I use your printer? (may) 7. Do you want tea or coffee? (would) 8. Excuse me, I'm never going to be late again. (will) 9. He was making so many mistakes that it was impossible to understand anything. (could) 10. I refuse to see him again! (won't) 11. I wasn't able to read music before going to a music school. (could) 12. I wish I hadn't told him all those offensive words. (should) 13. I feel it is my responsibility to see my grandparents more often. (ought) 14. It is not necessary to cook vegetables so long. (ought not) 15. Ask Alexander. It is possible he knows the answer, but I'm not sure. (might)

35. *Correct the mistakes.*

1. I don't can speak Chinese. 2. If you want to improve your programming skills you should to work harder. 3. Do you must be so rude? 4. Could you telling me the difference between modal and ordinary verbs? 5. Every student of our group musts to have regular medical check-ups. 6. You should to see a doctor. 7. When you will graduate from university? 8. We ought be more concerned about the environment.

TIME REFERENCE

STUDY NOTE. Could can be used to refer to the past on its own:

She can speak French. She could speak French when she was a child.

Modal verbs can normally refer to either the present or future:

You should exercise more. You should try to visit us next year.

We use **to be able to** and **to have to** instead of **can** and **must** to refer to the future and past. We can also use **to be allowed to** instead of **may** and **to be supposed to** instead of **should**.

I can finish this work. I will be able to finish this work tomorrow. I was able to finish this work on time.

Where have you been? You were supposed to be at home.

We can use **modals** to refer to the past by adding **have + past participle**:

I must have forgotten to lock the door.

She could have found the note.

You should have read this book long ago.

In reported speech we change **can** to **could** or **was able to**, **may** to **might** or **were allowed to**, **must** to **had to, will** to **would**:

He said, "I can help you". He said that he could help me.

36. ***Rewrite the following sentences in the past.***

Example: *He may take the sick leave if he gets ill. → He* ***was allowed*** *to take the sick leave because he got ill.*

1. You must show your identity card. → When I wanted to get into the building _____. 2. We can't buy a new car. → Last year we also_____. 3. Mike may take my laptop for a couple of hours. → When he was writing his report _____ . 4. Victor must call his mother immediately. → The doctor said that _____. 5. (Walls are not papered). You shouldn't paper the walls. → (Walls are papered) You shouldn't _____ . 6. "I will be in the office at 9 am". → She said that she _____. 7. You may retake the exam in Mathematics today. → After I passed all other exams _____. 8. You must be careful when crossing the street. → When we were crossing the street _____ . 9. The doctor can see you now. → The nurse said that _____. 10. You must complete all the assignments on time. → When I was at university I_____.

37. ***Rewrite the following sentences in the future.***

Example: *You may take the sick leave if you get ill. → ____ when you get ill.*

*You **will be allowed** to take the sick leave when you get ill.*

1. He can't get the tickets. → I'm afraid he____ 2. You may use my camera. → Tomorrow I_____ . 3. You must complete a lot of assignments. → When you go to university you _____ . 4. You must tell me the truth. → Very soon you_____ . 5. I can read this book in its original language . → In two years I _____ . 6. I must take this medicine three times a day. → Next week you_____ . 7. Now you can be discharged from hospital. → When you feel better_____ . 8. You must call the police. → If he doesn't pay _____ . 9. The doctor can see you. → The doctor _____ in twenty minutes. 10. You may go home now. → You _____ only after you finish the job.

must/have to

Must expresses duty or internal obligation which is imposed by the speaker:
I must eat vegetables. The students must speak only English in class.
Mustn't expresses categorical prohibition: *You mustn't eat sugar.*
Have (to) means necessity due to circumstances: *We missed the train. We will have to wait long now.*
Don't have (to) expresses lack of need: *You don't have to finish the report today.*
Had (to) is used instead of **must** in the past tense**:** *We must finish our work on time. → They worked day and night because they had to finish their work on time.*
We use **do, does, did** to form questions and **do not, does not, did not** in the negative of **have (to)**: *We didn't have to do the exams last year. Do we have to take our shoes off?*

38. *Complete the sentences with the verbs given below. In sentences 7, 8, and 10 two options are possible with a slight difference in meaning or context (spoken/more formal).*

must, mustn't, have to (3), had to, don't have to, doesn't have to, didn't have to, will have to.

1. You _____ have a passport to travel by train from one Russian region to another. 2. Sorry, I can't come out tonight, I _____ do the shopping with my mother. 3. Bob

didn’t know he _____ read about their company before meeting with the boss. 4. That sign means that you _____use your phone here. 5. I’ve taken some of her luggage, so she _____ pay the excess baggage fees. 6. I_____ do my project yesterday, because I had already finished it. 7. You _____ pay anything, it’s a present! 8. I think you _____ to read the book if you want to understand the story. 9. You’ll _____ pay for the book that you have lost. 10. I don’t really want to go to work tomorrow but I _____.

can/could/was able to

We use **can** for general ability in the present and **could** for general ability in the past: *I can drive. When I was little I could ride a bike.*

We use **was able (to)** for a particular situation in the past which was completed successfully: *He was able to complete the job on time.*

We also use **couldn't** for both general and specific situations: *I couldn’t answer all the questions.*

We can use **managed (to)** to suggest a degree of difficulty: *I woke up late but I managed to get to university on time.*

39. *Choose a better option.*

1. I *have been able to/could* swim since I was five. 2. You *will be able to/ can* speak perfect English if you practice a lot. 3. I would like *to be able/to manage* to play the piano. 4. He *was not able to/couldn’t* take part in the race last month because he fell ill. 5. Peggy Whitson, NASA astronaut, said that one of the hardest things about space flight was the fact that she *could not/didn’t manage to* speak Russian well enough to understand the other members of the crew. 6. We *managed to/could* find the video about space exploration we wanted to watch after searching for it for an hour. 7. Eventually, the astronaut *was able to/could* squeeze back inside the capsule safely. 8. Christopher Conselice, a professor of astrophysics at the University of Nottingham, believes that one day we’ll *be able to/can* find out that there is other

life in the universe. 9. Although the pilot was badly hurt he *could/ was able* to land the plane. 10. Exercise *can/manages to* reduce stress.

40.* ***Rewrite the following sentences using the underlined modals or their equivalents in the past and/or the future using the prompts.***

Example: *Modern computers <u>can</u> operate at high speeds. → Early computers <u>were not able</u> to operate at high speeds. (past) → Next generation computers <u>will be able</u> to operate at even higher speeds. (future)*

1.You <u>can</u> add graphics to your website. Your website is not appealing. You _____ _____ (add) graphics to make it more visually appealing. (past) OK, it is not too late. You'll still_____ to add graphics when you develop it further. (future)

2. <u>Can</u> I use your phone? He asked me if _____. (reported speech) I'm afraid you _____ to use your mobile phones during the test. (future)

3. My father <u>can</u> drive very well. My father taught me to drive. So, when I was taking my driving exam I _____ drive very well. (past) After thirty hours of driving with a driving instructor you _____ to drive fairly well. (future).

4. You <u>may</u> ask questions only after the presentation. The speaker said that we_____ ask questions after the presentation. (past). You _____ to ask questions only after the presentation. (future).

5. If you suspect that an e-mail has a virus, you <u>must</u> delete it immediately. I'm afraid my computer is infected. I _____ that suspicious e-mail. (past) If I suspect that an e-mail has a virus, I'll _____ it immediately. (future)

6. This sentence looks wrong - there <u>must</u> be a mistake. He said that it looked wrong and that there _____ a mistake (past).

41.* ***Complete the sentences using 'shall, can, may, would, might, should, can't, or must' and translate the sentences.***

1. All the e-mails _____ start with a friendly greeting. 2. If I knew how to do it I _____ add attractive banners to this web page. 3. With Grammarly's AI powered writing assistant you _____ compose mistake-free writing. 4. Our English teacher speaks with an American accent, so she _____ be from the USA. 5. He _____ be

a good researcher. I know some of his projects. 6. You _____ a good IT specialist. You don't even have a working knowledge of the HTWL language. 7._____I use the printer? I need to print out my report. 8. Before you start to make a website, you _____ decide how to organise the content. 9. He said that AI _____ replace humans in the future. 10. _____ I scan your computer for viruses?

42. ***Modal verbs summary. Match the example sentences with modals (1-30) and their meanings and/or functions (a-dd). Write your own examples with modal verbs in different meanings.***

Modal	**Example**	**Meaning**
Can	1. Superman can fly. 2. Can I borrow your pen? 3. You can't be hungry! We've just had lunch.	a. doubt/disbelief/surprise/improbability b. request/permission/ prohibition c. physical and mental (in)ability/opportunity
Could	4. He could play the piano before he could read. 5. Could you stop calling me Al? 6. Where have you been? You could have called at least! 7. It couldn't be Ann. She is in St.Petersburg.	d. suggesting/requesting e. expressing/questioning possibility f. past ability/inability g. reproach
May	8. May I go out? 9. You may leave early tomorrow. 10. He may come in the evening.	h. possibility i. permission/prohibition j. formal request/ offer
Might	11. You might pick me up on your way to the airport. 12. It might be very cold in winter in Moscow. 13. You might have warned me.	k. expressing/questioning possibility. l. reproach with have +past participle m. making a tentative request

Would	14. Would you please be quiet? Would you like me to help? 15. He would spend all his free time in the lab when he was doing his research. 16. He said he would answer all the questions after the presentation. 17. I would never consider changing careers.	n. future in the past o. hypothetical meaning p. habitual events /repeated state in the past q. offering something/requesting/commanding
Should	18. You should try to watch films in English. 19. You should have come to that party. 20. He suggested that we should go there immediately.	r. in certain that clauses s. reproach with have+past participle t. recommendation /advice/obligation
Must	21. I really must be going now. 22. You must never see her again. You mustn't smoke here. 23. He must be at home now. Jeremy must have left the city.	u. confident assumption/ high probability v. strong command/ recommendation/prohibition. w. 'internal' obligation/necessity
Shall	24. Shall I close the window? 25. Shall we go out tonight?	x. asking for instructions or permission (formal) y. making a suggestion
Will	26. Will you please stop speaking to me like that. 27. I will do my best. 28. It won't be easy to find another secretary.	z. talking about the future aa. command or request bb. promise or determination to do something

Ought to	29. She ought to be at home by nine. 30. You ought to have told her the truth.	cc. used to say that you expect something to be true dd. used to say what is the correct or best thing to do

43. ***Define the function/ meaning of the missing modals and fill in the gaps choosing from the modal verbs in the box.***

A.

mustn't (2), couldn't, can, must (2), can't (3), should

1. He is overweight, so, he _____ run so fast. 2. He is very tall, so he _____ play basketball. 3. You _____ park your car here it is no-parking zone. 4. Many schoolchildren _____ wear a uniform. 5. I _____ come with you now because I'm studying for my test. 6. Footballers _____ touch the ball with their hands. 7. I'm sorry I _____ come to your party, I had to do some urgent work. 8. I'm very tired. I _____ do anything. I'll do my homework tomorrow. 9. If you have a bad headache you _____ go to bed. 10. When you travel you _____ carry your passport everywhere.

B.

must (2), may/might (2), can't (2), mustn't, should (2), would

1. You really _____ see that new TV programme. It is fantastic. 2. You_____ speak so loudly, people are working here. 3. We _____ watch TV or go to the cinema tonight. 4. According to the weather report it _____ rain this afternoon. 5. You _____ take your English exam seriously, even if your level of English is high. 6. You _____ take your student card with you, otherwise you won't get in. 7. Mike _____ have left the house. His mobile is here, and he never leaves without it. 8. You _____ go without a ticket. All seats are reserved. 9. You _____ have gone to the doctor when you started feeling ill. 10. I _____ like to go the cinema with you this weekend. What do you think?

C.

could, could/can, couldn't, must (2), mustn't, will (2), should, would

1. When I went to Turkey for the first time, I _____ understand a word of Turkish. 2. They _____ have informed us about the flight delay. 3. You _____ smoke in public places or restaurants. It is against the law. 4. They _____ have left without saying good bye. Nobody saw them leave. 5. I promise I _____ do my best to help you. 6-7. You _____ have taken my advice and gone to the doctor. You _____ feel better now. 8. If you insist, she _____ probably tell you the truth. 9. I _____ play tennis a few years ago, but I haven't practiced since then so I'm not sure if I _____ play anymore. 10. All candidates _____ send in their application forms by Friday

D.

must (2), mustn't, might not, ought, can't (2), shouldn't/may, won't, shall

1. You _____ touch the oven. It is very hot and you _____ hurt yourself. 2. You look tired. You _____ to stop training. Take a break. 3. He _____ have eaten all the food. The fridge was full. 4. Everyone passed the first test. So it _____ have been difficult. 5. Students _____ leave the room during the exam. It is against the rules. 6. We _____ have taken the wrong turn. We are lost. 7. There are signs all over the place, so you _____ have any trouble getting there. 8. Leaving without an umbrella _____ be such a good idea. В ключах должно быть not It looks like it is going to rain. 9. You still haven't finished your homework. It _____ be very difficult then. 10. I don't think I'll be able to do the job on time. What _____ I do?

SEMI-MODALS AND PHRASAL MODALS

44. ***Read the following sentences paying attention to the meaning and form of the highlighted words. What are they called? How are they similar and different from the 'pure' modal verbs? How are questions and negative forms with these expressions formed? Use your dictionaries if necessary.***

1. You needn't buy your own textbooks. 2. Nothing needs to be changed on this page. 3. How dare you suggest that I was lying! 4. Would you dare to tell him the news? 5. You'd better get here soon or they won't let you in. 6. Had I better speak

to my colleagues before I send this form off? 7. Hadn't you better switch your computer off? It might overheat if you leave it on. 8. Are parents who have a lot of money likely to spoil their children? 9. People are not likely to listen to him now because they know he lied. 10. Am I supposed to be at the meeting on Tuesday? 11. The train is to leave in 10 minutes. 12. This amount of work is not to be done in one month. 13. This average schoolboy was to become a world-famous football star. 14. Does your son have to do exams this year? 15. When we have morning classes I have to get up very early. 16. When I was preparing for my exams last spring I had to work really hard. 17. Luckily, I don't have to get up early every day. 18. One of the requirements for this job is that you should be able to work in a team. 19. Only one person was able to beat the record. 20. Speak louder or she won't be able to hear you.

STUDY NOTE. Some of these words belong to a group of so called '**semi-modals'** and others are called **'phrasal modals'**. (see the table below)
Similar to 'pure' modals they are used to show if we believe something is **certain, possible, impossible, etc**.
Have (got) to and **be able to** are modal in meaning but not in form and are often used instead of **can and must. Need** and **dare** can be used both as modal and ordinary verbs.

SEMI-MODAL VERBS

need dare to have (got) to to be able to to be to

PHRASAL MODALS

To be bound to, to be supposed to, to be likely to, to be certain, had better, would rather, to be allowed to, it is possible, used to, etc.

45. ***Rewrite these sentences in a different way using the word given in brackets.***

Example: *You may use a dictionary in class. (to be allowed) → You are allowed to use a dictionary in class.*

A. 1. Last term we had online classes. It wasn't necessary to go to university. (have to) 2. I'm afraid I haven't studied properly during the term so now it is necessary for me to work really hard. (have to) 3. We've completed the experiment. It isn't necessary to worry about the deadlines. (need) 4. It isn't necessary to know the name of the person who complained. (nobody/need) 5. This topic isn't going to be in the exam. It is not necessary to spend much time on it. (need) 6. You waited for me but it wasn't necessary. (need) 7. You bought a lot of food but it wasn't necessary. (need) 8. I managed to get to the meeting on time, despite the fact that the train was late. (be able) 9. I can swim. I learned to swim at the age of five. (be able) 10. After completing this course we will learn to speak English fluently. (be able) 11. Strangers are not allowed to enter this building. (be) 12. I wish she got here soon or she will miss the opening ceremony. (had better) 13. I'm even afraid to think how much it is going to cost. (dare)

B. 14. It was expected that it would rain today. (be supposed) 15. It is late. You should take a taxi. (had better) 16. Robert has worked hard lately. It looks as if he will get a bonus this month. (be likely) 17. They say we may leave when we finish. (be allowed) 18. I'm sure it will result in extremely serious circumstances. (to be bound to) 19. You ought to take your dog to the vet. (had better) 20. I think the journey will take about two hours. (be likely) 21. There's no necessity for anyone to come in tomorrow. (need) 22. There is no need to go now. We still have some time left. (need not) 23. It is not necessary for us to go to school on Saturday. We have a five–day week at school (not to have to) 24. It was not necessary for him to explain the situation. Everyone knew what was happening. (need not) 25. She must work hard, because she is a single parent. (have to) 26. The weather is awful, so I prefer to stay at home rather than go out tonight. (would rather)

46. ***Complete the sentences with the expressions from the box.***

Been allowed, (to) have to (3), be allowed, (to) be able (2), been able

1. I'd like _____ to see my family more often. 2. He's never _____ to understand statistics. 3. My younger sister has never _____ to go out alone. 4. I'm sorry _____

tell you the truth as it is. 5. After the exams we'll _____ to do what we want. 6. I'm afraid we will ____ study day and night to prepare for the exams. 7. They don't _____ go to school tomorrow. It is Sunday. 8. That must not _____ to happen.

INDEPENDENT FURTHER STUDY

47. ***Match the words on the left with the definitions on the right.***

1.in orbit
2. a satellite
3.to lift off
4.a crew
5.a capsule
6.spacecraft
7.a mission
8.a manned flight
9.a lunar landing
10.microgravity
11.weightlessness
12.a space suit

a. an artificial or celestial body in space that moves around a planet
b. travelling around a planet, star, etc.
c. space travel with a human crew
d. an event in which people land on the moon
e. a condition where the force of gravity is weak
f. to leave the ground
g. a group of people who work closely together
h. a vehicle used for transporting people in space
i. a piece of clothing to protect the body when outside a spacecraft
j. an important task
k. the state of having no weight
l. the part of the spacecraft in which the people on it live

48. ***Match the underlined verbs from the sentences with their definitions. Practice giving the definitions of 'space' verbs.***

1. It is hard <u>to discover</u> a new planet.
2. The rocket will <u>be launched</u> this afternoon.
3. You need a telescope <u>to watch</u> the stars.
4. The aim of this program is <u>to explore</u> life on Mars.
5. Space tourists would like <u>to travel into</u> space.
6. All planets in the Solar system <u>orbit</u> the Sun.

a. to search to learn about something
b. to find something, usually for the first time
c. to go around a planet or star
d. to go on a journey to a place that is far away

7. Mir station was built and maintained by Russian rocket scientists.
8. Special capsules are used to deliver cargo to the ISS.
9. Some astronauts have stayed on the ISS up to 187 days.
10. It was believed that the ISS would establish the base for a trip to Mars.

e. to keep in good condition
f. to start a company or a project
g. to remain in the same place
h. to look at something for a longer time
i. to take goods, food, parcels etc. to a certain place
j. to send something into space

DEGREES OF PROBABILITY

STUDY NOTE. When we express our **assessment** of the possibility/probability/likelihood of a situation or event we usually use these modals:

\+ That must be the wrong address. (very certain, based on deduction)

↑ That should /could/may/may not/ might/ might not be the wrong address. (probably, based on expectation, or likely, based on speculation)

\- That can't be the wrong address. (highly unlikely/impossible)

49. ***Study the following examples. Match them with the expressions (a-d) according to the degree of probability they describe.***

1. You've been working since early morning. You must be tired! 2. I can't find my iPod! It should be on your desk. 3. It may well be in your bag. 4. It might be under the table. 5. You could have left it at home. 6. You can't have left it at school!	➢ very certain ➢ probably (based on expectation) ➢ possibly/likely (based on speculation) ➢ impossibility/disbelief

50. ***Rewrite these sentences in another way using the modal given. Explain the difference in the degree of probability in the examples below.***

Example: *I am sure they are ready for their exams. → They must be ready for their exams.*

A. 1. I'm sure this is the film we saw last week. (must) 2. This definitely is not the agency where we booked our trip. (can) 3. Maybe this is the number that he gave. (could) 4. I'm sure we are going to have cold weather in winter. (will) 5. Someone is calling. Perhaps it's Mike. (might) 6. The speed of light is 186282 kilometres per second? I'm sure that's wrong. (must) 7. Two thousand roubles? I'm sure this bill isn't right. (can) 8. There is a possibility of having longer holidays in summer. (might) 9. I'm sure you're going to pass your exams. (will) 10. I don't believe that is the right answer. (can)

B. 11. I know you didn't see me yesterday because I wasn't at university. (can) 12. He has a beautiful house. I'm sure he's very rich. (must) 13. Maybe Nick is ill. (could) 14. I can't find my phone. Perhaps I've left it at home. (might) 15. Why do you think Alexander hasn't arrived yet? Has he missed the train? (must) 16. Possibly Sam will join his father's company. (may) 17. I don't think it is easy to pass this exam. (cannot) 18. Perhaps we'll meet soon. (might) 19. Who knows? Possibly we'll go on holiday in July. (may) 20. Maybe we'll go to the seaside. (could)

51.* Use ***the right modal (may, might, can't, could, or couldn't).***

1. He _____ have been busy. (probable) 2. He _____ have been sick. (possible). 3. It _____be true. (disbelief) 4. She _____ have said it. (disbelief about the past) 5. She _____ be waiting for you at the main entrance. (weak possibility) 6. They play brilliantly. They _____ lose. (impossible) 7. They _____ be watching a video at the moment. (probable) 8. They _____ be poor. Look at their huge house. (impossible) 9. I really have no idea why he hasn't come. He _____ have been too tired to go to the party. (assumption) 10. I've lost my keys, they _____ be at work or they _____ be in the car. (possible)

52*. *Read the text and fill in the gaps with the modals from the box. Retell the text.*

Could (2), will, should, would (4), wouldn't, may not (2), had, needed, are likely

Scientists Say Most Likely Number of Contactable Alien Civilisations Is 36

According to new calculations there (1)_____ be more than 30 intelligent civilisations in our galaxy today capable of communicating with others. Experts say the new work not only offers insights into the chances of life beyond Earth but (2) _____ shed light on our own future and place in the cosmos.

In 1961 the astronomer Frank Drake proposed what became known as the Drake equation, setting out seven factors that (3) _____ to be known to come up with an estimate for the number of intelligent civilisations out there. Researchers from the University of Nottingham refined the equation and made the assumption that intelligent life (4)_____ form on other [Earth-like] planets like it did on Earth and (5)_____ automatically form as a natural part of evolution**.**

Under the strictest set of assumptions there (6)_____between four and 211 civilisations in the Milky Way today capable of communicating with others, with 36 the most likely figure. The team of researchers add that our civilisation (7)_____ need to survive at least another 6,120 years for two-way communication. They believe alien life (8)_____ have similarities in appearance to life on Earth and we (9)_____ be super shocked by seeing them. They (10)_____ be little green men. They (11) _____ arrive in a vast spaceship.

Prof Andrew Coates, from University College of London, said the assumptions made by his colleagues were reasonable, but the quest to find life (12)_____ to take place closer to home for now. "This new estimate (13)_____ be impossible to test using current techniques," he said. "In the meantime, research on whether we are alone in the universe (14) _____ focus on visiting likely objects within our own solar system, for example, missions to Mars. It's a fascinating time in the search for life elsewhere."

53. ***Read an extract from the article about Konstantin Tsiolkovsky and answer the questions.***

- What is Tsiolkovsky famous for?
- Was there any new information for you in this text? What information was it?

KONSTANTIN TSIOLKOVSKY is considered the father of spaceflight. Working as a teacher he spent most of his time conducting research on **many** aspects of future space travel and rocket propulsion. In 1903 he published the rocket equation in a Russian aviation magazine. This equation is the basis of **much** of the spacecraft engineering done today. Though he did not get any financial support, he designed airships, developed the first Russian wind tunnel, and proposed the idea of a fully metal aircraft. The other ideas that Tsiolkovsky proposed included steering rockets in flight with graphite rudders, pumps to drive fuel from storage tanks to the combustion chamber, and the need for pressurised suits which astronauts have to wear outside spacecraft.

His ideas preceded the Space Age by **several** decades, and **some** of his innovations materialised later. He was simply ahead of his time. Shortly before his death, he wrote: "**All** my life I have dreamed that mankind will become at least **a little** more advanced because of my work**". A few** years after his death leading Russian rocket-engine designer Valentin Glushko and rocket designer Sergey Korolyov studied Tsiolkovsky's work, and **both** tried and succeeded in turning Tsiolkovsky's theories into reality. **Every** day, the people who work in the field of space research share new designs, build test models, and try to imagine better ways to explore the vast deep mystery that is outer space.

54. ***Look at the words in bold in Exercise 53. What are they called? Can you give more examples of the same class of words?***

STUDY NOTE. We call these words **quantifiers.** They come at the beginning of a noun phrase and tell us something about quantity. The most common quantifiers include **all, another, any, both, each, either, enough, every, (a) few, (a) little, no, several, some, many, much, (a) lot(s) of**.

55. ***Decide which quantifiers can be used with countable nouns, uncountable nouns or both. Complete the table.***

Uncountable Nouns	Countable Nouns	Countable and uncountable nouns
much	*many*	

56. ***Complete the rules with can or cannot.***

1. We _____ use ***many/several/a number of*** with countable nouns.
2. We _____ use ***many/ several/a number of*** with uncountable nouns.
3. ***Both/neither*** _____ refer to a group of two.
4. ***Little/a little*** _____refer to countable nouns.
5. ***Most/some/all*** _____ refer to both countable and uncountable nouns.

57. ***Choose the correct option.***

1. I need some/many information. 2. How many/much travel will the job require? 3. Ann and her brother are athletes. They all/both won gold medals. 4. Before setting up your business, ask experienced people for several/some advice. 5. If you need some/a number of cash, use an ATM machine. 6. Do you think there is too many/much sport on TV? 7. Climate is changing as there's too much/little carbon dioxide in the air. 8. How much/many data can the hard drive of your computer store? 9. Her hardware is fine, but she needs to get some/any new software. 10. The customs officer at the airport checked all/every our baggage.11. We spent many/much time in the hotel room because of the bad weather. 12. Jack is keen on football but unfortunately he has no/few ability to play it. 13. There isn't any/some point in getting upset about it. 14. A number of /a little changes have been made in the test. 15. Every/all student has to fill in the questionnaire.

58. ***Reread texts 6A, 6B, 6C and answer the following questions.***

1. What do you think of the importance of space exploration? 2. Name a few inventions or benefits which resulted from space exploration. 3. Which industries

benefit the most from space exploration? 4. How different would be the world without satellites in orbit? 5. What experiments are carried out on board the ISS? 6. What does the abbreviation SETI stand for? 7. What is the aim of SETI Institute? 8. What do you think of the idea of looking for signs of life in space? 9. Name three top key events in the history of space exploration. 10. What are the most important achievements in space research that have been made over the past years?

CHECK YOURSELF

59. The ISS Quiz. ***How much do you know about the ISS?***

1. Which word best describes the building of the International Space Station?

A. Competitive; C. Cosmetic;

B. Collaborative; D. Corrosive.

2. What does it mean when you say "the ISS was assembled in piecemeal fashion?"

A. It was put together piece by piece. C. It was put together on an assembly line.

B. It was put together on Earth and then sent into space. D. It consists of different modules.

3. What was the first component of the ISS?

A. Unity; C. Zarya;

B. Mir; D. Zvezda.

4. Which of the following is true about the ISS?

A. More than 20 countries have helped build and maintain it.

B. It proves that space travel is worth the time and effort.

C. Many scientific experiments are carried out onboard.

D. The Columbia space shuttle disaster caused delays in its construction.

5. Which of the following countries did not participate in the ISS construction?

A. Brazil; C. China;

B. Canada; D. Sweden.

6. How do astronauts breathe on board the ISS?

A. They carry oxygen tanks around with them at all times.

B. They wear special masks that filter oxygen from the ambient air for them.

C. They use generators that split water molecules into hydrogen and oxygen.

D. The space station carries its own very large supply of oxygen.

7. The ISS must be constructed in space because

A. It is cheaper. C. It can only be done in microgravity.

B. It is easier. D. Other blocks are not ready yet.

8. If you wanted to go to the ISS, how would you get there?

A. On a Soyuz spacecraft; C. On an Apollo module;

B. On a Boeing 767; D. On a Voyager spacecraft.

9. If you weighed 100 newtons on Earth, how much would you weigh on the ISS?

A. 100 newtons; C. 1 newton;

B. 10 newtons; D. less than 1 newton.

10. If the ISS closes in 2025, how many years will have passed since the first modules were launched?

A. 7 years; C. 27 years;

B. 11 years; D. 29 years.

60. ***Vocabulary Quiz. Choose the best answer a, b, or c.***

1. We need a significant _____ of time and energy in order to achieve success.

a. spending b. investigation c. investment

2. The government expanded the police force in their _____ to reduce crime.

a. achievement b. effort c. investigation

3. All employees receive paid holiday. _____ , they are offered a range of benefits for children.

a. therefore b. nevertheless c. in addition

4. Good education _____ your career prospects.

a. enhances b. enlarges c. incorporates

5. All the texts in this unit _____ to space exploration topics.

a. regard b. relate c. respond

6. A recent _____ showed that 50 percent of respondents were against investing into space exploration.

a. survey b. assessment c. estimation

7. Trying to be in touch with your friends any minute might _____ you from preparing your assignments.

a. delay b. destroy c. distract

8. One of the purposes of the Mars Exploration program was _____ if Mars was suitable for life.

a. to overcome b. to address c. to find out

9. The film 'Attraction' is about a(n) _____ spacecraft that crash-lands in the Chertanovo district of Moscow.

a. alien b. foreign c. overseas

10. The word 'extraterrestrial' _____ to something coming from a place outside the planet Earth.

a. relays b. responds c. refers

11. When he _____ his studies, he will be able to find a better job.

a. overcomes b. graduates c. completes

12. The government set up a commission _____ the reasons for the accident.

a. to overcome b. to search c. to investigate

13. The figures show that a number of research projects are _____ .

a. along the way b. underway c. out of the way

14.The spacecraft carrying a _____ of three was launched from Baikonur.

a. group b. crew c. company

15. Online education can be the environment for _____ and intellectual development.

a. collaboration b. coordination c. collocation

16. Available oxygen (O2) is an essential _____ for life on other planets.

a. quality b. property c. condition

17. Thanks to the Lunokhod program lunar soil _____ were successfully brought to Earth to study.

a. tests b. patterns c. samples

18. Yuri Gagarin was _____ out of 20 other perspective cosmonauts for the first launch.

a. determined b. selected c. favoured

61. ***Match the descriptions of the meanings of the modal verbs with the examples below.***

ability / possibility / strong command / ability / disbelief / logical deduction / disapproval / necessity / prediction / necessity

1. She can swim. 2. It can`t be her. 3. You must do as your father says. 4. It might rain tomorrow. 5. The family should be home soon. 6. It will rain in the North. 7. You must try to get here earlier in the future. 8. You might at least have talked to him. 9. I'm afraid I must be going now. 10. We can see the lake from our bedroom window.

62. ***Give the descriptions of the functions of the modal verbs in the examples below. The first letter is given.***

1. Can you please give me a hand? (r…..) 2. May I help you? (o…… h…..) 3. Can I take a day off tomorrow? (a….. f… p…) 4. You should stay in bed. (a……) 5. You could buy a smaller one. (s…….) 6. Would you like to join us? (i……..) 7. I'm afraid you can't swim here if you are not a member of the club. (r……. p……..) 8. You should learn how to be more polite. (a……) 9. You must stop. (c……..) 10. Shall we go to the cinema tonight? (s……)

Choose from: offering help, advice, invitation, suggestion, request, asking for permission, refusing permission, command.

63. *Choose the correct option. Translate the sentences into Russian.*

A.

1. We'll (must/have to) be in the office at 8 o'clock. 2. In the morning when I (was/could) (to) meet my future colleagues I felt excited and a bit nervous. 3. Every member of a trade union (must/ may) pay a union membership fee. 4. Why are you late? You (should/had to) have come at 10 a.m. 5. I`ve got a terrible headache. – You (should/have to) take an aspirin. 6. Don`t make so much noise. We (can`t/shouldn`t) wake up the baby. 7. I`m sorry I didn`t come yesterday. I (must/had to) work late. 8. I feel ill. –You (should /would) go home. 9. It (must/ may) rain tomorrow.10. You (can`t/mustn't) be tired you`ve only been working for half an hour. 11. You (mustn`t/can`t) be rude to your parents. 12. You (should/ought) to eat more fruit and vegetables if you want to be healthy. 13. I (couldn`t/ can`t) read or write when I was four years old. 14. I was feeling so nervous before the exam that I (could/might) hardly speak. 15. (Can/will) I borrow your pen?

B.

1. Our teacher (can/must/may) speak three languages. 2. They (were allowed to/might/had to) take every Friday off last year. 3. Your coat is quite new. You (mustn`t/needn`t/can`t) buy another one. 4. I` d like (to have to/to be able to/ can) play chess. 5. Students (cannot/needn`t/ mustn`t) interrupt their teachers. 6. I think I`ll (must/have to/can) go and explain everything. 7. You (can`t/needn`t/mustn`t) water the plants. I`ve already watered them. 8. We (might/had to/could) not get the medicine and returned home without it. 9. (Will/must/may) I have your book for a moment? 10. He`ll (may/can/be allowed to) drive when he is 18. 11. (Can/may/must) you play the guitar? 12. They live in a huge house and own three cars. They (can`t/can/must) be rich. 13. (Will/shall/would you like) I help you to carry the bags? 14. Are you sure you`ll (can/be able to/may) get to the bottom of it? 15. He had studied hard so he (had to/was able to/might) answer all the questions in the test.

MODULE 6 PROGRESS TEST

Vocabulary. Decide which answer a, b or c best fits into each gap.

The Invention of Space Travel

During the first half of the 20th century there was a general (1)_____that space travelling would soon be happening. In the historic (2)_____between America and the Soviet Union the Soviets won the first round when Yuri Gagarin was (3)_____ into space on April 12, 1961. He orbited the Earth in his (4)_____ Vostok 1, in a flight that lasted under 2 hours.

Other (5)_____ demonstrated the sophistication and precision that was possible in modern rocket science. Devices, whether (6)_____ , could be sent to explore the solar system, gather data and (7)_____ useful samples. It was very much the beginning of a new age, an age of physical reaching-out into the cosmos.

The (8)_____ of space continues. The competition has shifted gradually into (9)_____ with the US to build the ISS. There are also teams of research astronomers involved in systematic (10)_____ to find life elsewhere in the Universe. The project is called SETI, the Search for Extra-Terrestrial Intelligence.

1	a. exploration	b. investigation	c. expectation
2	a. cooperation	b. completion	c. space race
3	a. launched	b. sent	c. lifted
4	a. spacecraft	b. space rocket	c. space station
5	a. assignments	b. missions	c. adventures
6	a. inhabited and uninhabited	b. with and without men	c. manned and unmanned
7	a. maintain	b. collect	c. assess
8	a. exploration	b. examination	c. survey
9	a. relations	b. race	c. collaboration
10	a. tries	b. efforts	c. samples

Grammar. Decide which answer a, b or c best fits into each gap.

1. He _____ see the doctor last week because he was very ill.

a. must b. must have c. had to

2. I _____that bicycle because I didn't have space in the car for it.

a. couldn't take b. cannot take c. can't have taken

3. You _____ me about it. It wasn't nice to hear the truth from somebody else.

a. can have told b. could have told c. could tell

4. I _____stop reading. It's too dark here.

a. can b. have to c.am to

5. The meeting _____at 4 p.m. but the professor didn't show up.

a. was to have started b. had to start c. was to start

6. Soon home appliances _____ to report any breakdowns for repair.

a. might be able b. will have c. must be able

7. The secretary can prepare the report. You _____it.

a. don't have to do b. mustn't do c. can't do

8. You _____ stay in hospital! You haven't recovered yet.

a. can b. should c. may

9. Marconi was an Italian inventor and engineer who _____ broadcast the first transatlantic radio signal.

a. could b. was able to c. was to

10. Some people fear that AI _____ replace humans in a few years.

a. should b. ought to c. will

END OF THE YEAR GRAMMAR TEST

1. "How long does it take you to write the	13. "Have you ever been to Hungary?''

thesis?" "By May I…..on this one for 3 weeks."

a. will worked b. will have been working

c. will work d. will be working

2. "Why is Peter so upset?"

"He…..problems at work lately."

a. was having b. 'll be having

c. has been having d. will have

3. I'm afraid I …..to come to the meeting.

a. can't b. won't

c. won't be able d. don't

4. When I was a child I…..cycling every day.

a. had gone b. used to go

c. was going d. have gone

5. She….. for 12 hours before she finished everything.

a. 'd been studying b. 's been studying

c. is studying d. has studied

6. What …..at 9 am yesterday?

a. have you done b. were you doing

c. have you been doing d. had you done

7. "How long have you been staying here?" "….. 3 months."

a. – b. For

c. From d. Since

8. "Have you ever eaten lobster?"

"Yes. I ….. once."

a. eat b. ate

c. have been eating d. have

"Yes, I….. there last year."

a. have gone b. have been going

c. went d. have been

14. He hasn't left the laboratory….. .

a. already b. before

c. just d. yet

15. We ….. be going to China this spring, but we're not sure yet.

a. might b.must

c. would d. can

16. Voronezh,….. my father was brought up, is a beautiful city.

a. which in b. where

c. that d. which

17. "My books are wet from the rain."

"You……..the windows!"

a. shouldn't have shut b. must have shut

c. would have shut d. should have shut

18. Do you know …..that man sitting near Allan is?

a. who's b. which

c. whose d. who

19. Did you play tennis yesterday?"

"Yes, we did …..the rain."

a. however b. despite

c. in spite d. although

20. She said that her Dad…..a new car.

a. was going to buy b.will buy

c. would have bought d. is going to buy

9. “She looks slimmer.” “Yes, she…..8 kilos.” a. have been losing b. lost c. has lost d. have lost 10. …..I help you with the drawing? a. Will b. Am c. Shall d. Have 11. "What’s Alex doing? He must…….” a. to be reading. b. reading. c. have read. d. be reading. 12. She works ….. than anyone else in the world! a. slowly b. slowest c. slower d. more slow	21. You can't leave the lab ….. you finish the experiment. a. by the time b. before c. while d. during 22. Dan asked Mary when …..finish the task. a. would she b. she had c. will she d. she would 23. The scooter has a bad battery. You shouldn’t…….it. a. buying b. to buy c. bought d. have bought 24. How long .... here? a. you study b. do you study c. have you studied d. are you studying

Irregular verbs

1 форма (Present)	**2 форма (Past simple)**	**3 форма (Past participle)**	**Перевод**
be	was / were	been	быть
become	became	become	становиться
begin	began	begun	начинать
break	broke	broken	ломать
bring	brought	brought	приносить
build	built	built	строить
buy	bought	bought	покупать
can	could	—	мочь

catch	caught	caught	поймать
choose	chose	chosen	выбирать
come	came	come	прийти
cost	cost	cost	стоить
cut	cut	cut	резать
do	did	done	делать
drink	drank	drunk	пить
drive	drove	driven	водить
eat	ate	eaten	есть
fall	fell	fallen	падать
feel	felt	felt	чувствовать
find	found	found	искать
fly	flew	flown	летать
forget	forgot	forgotten	забывать
get	got	got	получать
give	gave	given	давать
go	went	gone	ходить
have	had	had	иметь
hear	heard	heard	слушать
hit	hit	hit	ударить

keep	kept	kept	держать
know	knew	known	знать
leave	left	left	уходить
lose	lost	lost	терять
make	made	made	делать
meet	met	met	встречать
mean	meant	meant	означать
pay	paid	paid	платить
put	put	put	класть
read	read	read	читать
run	ran	run	бежать
say	said	said	сказать
see	saw	seen	видеть
send	sent	sent	отправлять
sing	sang	sung	петь
shoot	shot	shot	стрелять
sit	sat	sat	сидеть
sleep	slept	slept	спать
speak	spoke	spoken	говорить
spend	spent	spent	проводить

stand	stood	stood	стоять
swim	swam	swum	плавать
teach	taught	taught	учить
take	took	taken	брать
tell	told	told	рассказывать
think	thought	thought	думать
understand	understood	understood	понимать
wake	woke	woken	будить
wear	wore	worn	носить
win	won	won	выигрывать
write	wrote	written	писать

Vocabulary List for Module 4

Essential vocabulary

advance (v, n)	продвижение, прогресс/ продвигаться вперед
application (n)	применение
artificial (adj) satellite (n)	искусственный спутник
average (adj)	средний
breakthrough (n)	прорыв, важное открытие
bring (v) to a new level	поднимать на новый уровень.
broadcast (v, n)	передавать, транслировать/ трансляция
carry (v) messages	передавать сообщения
data transmission (n)	передача данных
digital (adj)	цифровой

electromagnetic (adj) wave	электромагнитная волна
employ (v)	применять, использовать
enable (v) something	делать возможным
encourage (v) something	поощрять
evolve (v)	эволюционировать
expand (v)	расширяться
improvement (n)	улучшение
in ancient (adj) times	в древние времена
indispensable (adj)	незаменимый
integrated circuit (n)	интегральная схема
lead (v) (to)	вести (к)
means (n) of communication	средства связи
medium/media (n)	среда, средство/ средства
network (n)	сеть
obvious (adj)	очевидно
play (v) a role	играть роль
push (v) something forward	продвигать
rapidly (adv)	быстро
relation (s) (n)	отношение (отношения)
technique (n)	техника
telecommunication (n)	телекоммуникация
to result (v) in	иметь результатом
turning point (n)	поворотный пункт
wire/cable (n)	провод/кабель

Additional Vocabulary

amusing (adj)	забавный
attitude (n)	отношение
comprehensible (adj)	понятный, ясный
consistently (adv)	последовательно
convince (v)	убедить

emerge (v) /emergence (n)	возникать/ появление
emit (v)	излучать
essential (adj)	существенный, важнейший
exist (v)	существовать
groundbreaking (adj)	новаторский
imagine (v)	представьте себе
meanwhile (adv)	тем временем
nevertheless (adv)	тем не менее
prove (v)	доказать
sophisticated (adj)	сложный, утонченный
specific (adj)	конкретный, определенный
substantially (adv)	по существу, главным образом

Vocabulary List for Module 5

Essential vocabulary

a means of	средство
accept (v)	принимать
amazing (adj)	удивительный
appropriate (adj)	подходящий, соответствующий
assist /assistant	уместный, подходящий
calculate (v) /calculation (n)	рассчитать/расчёт
capable (adj) / capability (n)	способный/способность
character(s) (n)	символ(ы)
compare (v) /compared to	сравнить/ по сравнению
define (v)/definition (n)	определить/определение
design (v, n)	дизайн
drawback (n)	недостаток
embedded/built-in (adj)	встроенный/встроенный
entire	весь, целый
hardware (n)	оборудование
however (adv)	однако

integrated circuit (n)	интегральная микросхема
invisible (adj)	невидимый
latest/recent	последний/последний
numerous (adj)	многочисленный
ordinary (adj) (computer)	обычный (компьютер)
perform (v) instruction(s) (n)	выполнять (инструкции)
process (v) (data)	обрабатывать (данные)
recognise (v)	признавать
require (v) /request (n)	требовать/ запрос
respond (v) / response (n)	отвечать/ ответная реакция
scale (n)	шкала, масштаб
software (n)	программное обеспечение
solution (n)	решение
store (v) (data)	хранить (данные)
supercomputer (n)	суперкомпьютер
turn (v) into	превратиться

Additional Vocabulary

according to	согласно, в соответствии
algorithm (n)	алгоритм
artificial (adj) intelligence (n)	искусственный интеллект
be concerned with	заботиться (о), беспокоиться
be linked up with	быть связанным с
complete (v)	полный
control (v, n)	контролировать/ контроль
data (n)	данные
downside (n)	недостаток
draw attention	привлечь внимание
generation of computers	поколение компьютеров
impact (n, v)	воздействие/ воздействовать
invisible (adj)	невидимый

involve (v)	вовлекать, включать в себя
machine learning	машинное обучение
miraculous	удивительный
predict(v)	предсказать
pressure (n)	давление
privacy (n)	конфиденциальность
query (n)	запрос
rely/reliable	полагаться/ надежный
step forward	шаг вперёд
tiny	очень маленький
virtually	практически, поистине

Vocabulary List for Module 6

Essential vocabulary

accessible (adj)	доступный
accomplish (v)	выполнить
address problems (n)	решать проблемы
autonomous (adj) vehicle (n)	автономное транспортное средство
condition (n)	условие
connectivity (n)	способность к подключению
deal with (v)	иметь дело с
distract distraction (n)	отвлекать/ отвлечение внимания
earth (n)	земля
effort (n)	усилие
enhance (v)	усиливать
expand (v)	растягиваться, расширяться
exploration (n)	исследование
explore space (n)	исследовать космос
in addition	вдобавок, к тому же
innovation (n)	инновация

investigate (v)	расследовать, изучить
investment (n)	инвестиция
launch (v, n)	запускать/ запуск
mankind (n)	человечество (п)
mission (n)	миссия, задача
overcome (v)	преодолеть
promote cooperation (n)	поощрять сотрудничество
push (n) boundaries (n)	раздвинуть границы
relate (v)	относиться
significant (adj)	значительный
spacecraft (n) (pl. spacecraft)	космический корабль
search (v, n)	искать, поиск
universe (n)	вселенная

Additional Vocabulary

alien (n, adj)	инопланетянин/ инопланетный
announce (v)	объявить
assemble (v)	собрать
attempt (n)	попытка
be underway	быть в процессе осуществления
collaboration (n)	сотрудничество
compelling (adj)	убедительный
completion (n)	завершение
condition (n)	условие
crew (n)	экипаж
deliver (v)	доставить
determine (v)	определить
establish (v)	установить
facility (n)	оборудование, приспособления, услуги
find out (v)	найти
investment (n)	вложение денег, инвестирование

mainstream (adj)	основной
maintain (v)	поддерживать, обслуживать
manned (adj)	пилотируемый, с человеком на борту
permanently (adv)	постоянно
purpose (n)	цель
refer something	направлять, отсылать
remarkable (adj)	замечательный
sample (n)	образец
sign (n)	знак
stand (v) for	означать
stay (v) on board	оставаться на борту
survey (n)	обзор, исследование
testing ground (n)	полигон
weigh (v) /weight (n)	весить/ вес.